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II.

FLORA NOVÆ-ZELANDIÆ.

BOTANY OF NEW ZEALAND.

Part II. FLOWERLESS PLANTS.

THE BOTANY

OF

THE ANTARCTIC VOYAGE

OF

H.M. DISCOVERY SHIPS *EREBUS* AND *TERROR,*

IN THE YEARS 1839–1843,

UNDER THE COMMAND OF

CAPTAIN SIR JAMES CLARK ROSS, KT., R.N., F.R.S. & L.S., ETC.

BY

JOSEPH DALTON HOOKER, M.D., R.N., F.R.S. & L.S., ETC.

ASSISTANT SURGEON OF THE "EREBUS," AND BOTANIST TO THE EXPEDITION.

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FLORA

OF

NEW ZEALAND.

Part II. CRYPTOGAMIA.

Nat. Ord. FILICES, *Juss.*

Ferns and their allies are by far the most conspicuous, and at the same time beautiful, Natural Orders of New Zealand plants. I have enumerated 117 species in the following synopsis, a number which, for reasons I have elsewhere stated (Introductory Essay, p. vi), is not likely to be much augmented by novelties, though it may be doubled by those who attach importance to those variations of outline and texture which I do not find accompanied by such peculiarities of structure as would induce me to consider them of specific value. Except a comprehensive view be taken of the species of Ferns, and considerable latitude be allowed for their variations, there are no limits assignable to the number of forms they present, which may be defined by a name, though not possessing constant characters. Every species of wide distribution displays such a tendency to vary with each modification of temperature, soil, and exposure, that none can be pronounced distinct from its allies until examined in all its forms and from many countries. It is an unfortunate circumstance for the state of Pteridology, that this fact has been so systematically disregarded by naturalists, that this Natural Order is encumbered with a synonymy which is quite unparalleled in any other of the Vegetable Kingdom.

The remarkably wide dispersion of the individual species of Ferns is another fact that should enforce caution in their study; but though every succeeding work on the subject enlarges our knowledge of the range of each species, instances are daily occurring of plants being proposed and described as new, which have no claim to novelty but their birth-place.

I would particularly draw the attention of the New Zealand student to two principles,—on the one hand, that he must allow some latitude to the construction of the characters I have laid down, and on the other, that though a Fern under examination may be obviously new to this Flora, it is not therefore necessarily new to science. The neglect of this latter consideration has added numerous names to the New Zealand Ferns: in one case a New Zealand Fern well known to general botanists for many years, was found in Europe for the first time, and, because not included in any European Flora, was named and described as a

new species; and in very many other cases better known Ferns, on being found for the first time in New Zealand, have been described as new, though well known and long described as inhabitants of Europe and many intermediate countries. It need hardly be observed, that a little of that general knowledge of the Natural Order which every one ought to possess, who essays describing its species, would prevent such errors; as would the consultation of a general herbarium, previous to which no one should attempt publication in systematic botany.

Of the 117 species comprised in this Flora, only forty-two are peculiar to New Zealand, so far as my materials enable me to judge; but when it is considered how little is known of the Ferns of the islands of New Hebrides and New Caledonia, it is not to be doubted but that some of those now considered peculiar will be found there: in support of which I would remark, that several of the New Zealand species which are not known to be natives of Australia or America have been found on the lofty mountains of Java, and others again in South Africa. Thirty of the New Zealand Ferns also inhabit South America, and sixty-one, or more than one-half, Australia and Tasmania; almost all the Ferns of the latter countries being natives of New Zealand. Twenty-five species are common to the three south temperate masses of land, Australia (including Tasmania), New Zealand, and South America; and upwards of thirty inhabit so many widely distant parts of the world that they may be termed cosmopolitan or mundane. Ten are European,—a small proportion,—but this arises from Europe, in common with the whole north temperate zone north of latitude 30°, being very poor indeed in Ferns, as compared with the tropical regions and south temperate zone; so that though these ten form so small a proportion of the New Zealand *Filices*, they include a very considerable part of the European ones.

With regard to the classification of Ferns, in no branch of Botany have more arbitrary characters been used for systematic purposes, and in none have natural characters been more overlooked. Since the time when the form of the sorus was employed for the purpose of classification, the genera have undergone two more or less general arrangements, founded on characters presented by organs whose importance is very differently estimated by botanists. For many years the only means adopted for grouping and limiting the genera was the presence or absence, form and insertion, of the involucre (or indusium); more lately, the disposition and ramification of the veins has been advocated as of paramount importance; and we are now threatened with a third fundamental change, founded on the habit, mode of increase, and development of the caudex or rhizome. It appears to me that all these organs afford characters of the greatest value, but that an arrangement founded on the consideration of one only can by no means be regarded as sound. No single character, or modification of a single organ, affords a clavis to the natural system of Ferns; by no one alone can the genera be naturally limited or naturally grouped. The tribes are no doubt best characterized by the structure of the capsules, by the position and perfection of the ring that partially or wholly surrounds them, and by the form of the spores, but these organs are of little or no further avail. With regard to the genera, it appears to me that the indusium, the venation, and the position and form of the sori, must all be taken into consideration, and that no one of these organs is to be considered as of much higher importance than the others, and none by itself of so great importance as any combination of the others; and that one character should never constitute a genus, except when accompanied by some very marked habit. The rhizome I consider in most cases to afford characters of specific importance only, because throughout the whole Natural Order it is found to differ much in species that are closely allied in every other respect. In one point of view the rhizome is a character of greater value than any other, for it never varies in a species, whereas there are many normally indusiate Ferns in which the indusium is not developed, others in which the indusium presents the characters of several genera on one frond; while in not a few cases the exclusive use of the venation has given rise to several genera being established on one species. It is

however an error to conclude that the organs least liable to vary in individual species are therefore the best adapted for the general purposes of classification, however conspicuous they may be. Though I consider habit of growth and the mode of development of the axis to be of higher systematic value in Cryptogamic plants than in Phænogamic ones, I am convinced that this is the case, not so much from these organs in Ferns presenting characters of higher structural or physiological importance than they do in flowering-plants, but from their value being greater in comparison with those afforded by the extremely simple organs of reproduction.

With regard to the analogies that exist, or have been supposed to exist, between the various organs of Cryptogamic and Phænogamic plants, I do not think they warrant our employing them for purposes of classification. I do not recognize any analogy between the two types upon which the rhizomes of Ferns are developed, and exogenous and endogenous wood; nor, were such an analogy to be established, or even were we warranted in considering Exogens and Desmobrya*, or Endogens and Eremobrya, identical in mode of development, would it follow that the rhizome of Ferns was of the same importance in a systematic point of view as are the stems of flowering-plants; for organs that afford characters of the highest importance in one Class or Natural Order, are valueless for the same purpose in another.

The following synopsis aims at little beyond a systematic arrangement of the New Zealand Ferns, accompanied with such characters as shall enable the student to name his plant and determine its affinities and distribution. In constructing it, I have often been obliged to adopt merely artificial characters, and in a few instances to separate widely closely-allied plants. It would have been easy to have arranged the species in a strictly natural series, but very difficult, if not impossible, to have so defined the genera, when thus arranged, that a student could avail himself of the arrangement. Under these circumstances, I have thought it better not to sacrifice utility to considerations of a highly scientific nature only, which could only be understood after a complete knowledge of the species is obtained, and which cannot then be appreciated by a study of the New Zealand Ferns alone. To obviate this defect, I have always given the true affinities of the misplaced species in the notes under itself, and under its nearest ally in the genus to which it should naturally belong.

Amongst the more important points to be attended to are the following. The tribes, though for the most part natural, are not of equal value; thus *Ophioglosseæ* and *Marattiaceæ* are structurally more different from one another and from the rest of Ferns than *Polypodieæ* and *Cyatheæ* are. The division of

* These are the terms employed by Mr. John Smith (of the Royal Gardens, Kew) for distinguishing the two forms of rhizome that prevail throughout Ferns: of these the *Eremobrya* throw off the fronds from different parts of an elongated rhizome, with which their stipites are jointed; in the *Desmobrya*, on the contrary, the fronds are clustered towards the apex of the rhizome, and their stipites are not jointed at their insertion. The *Hymenophylla*, the *Polysticha*, *Trichomanes*, and all the *Steganiæ* are Desmobryous, according to this definition; *Analepis*, *Phymatodes*, etc., are Eremobryous. Such are the definitions of the terms, as now defined to me by Mr. Smith. According however to an excellent little work on the British Ferns (Moore's Handbook, ed. 2), the term *Desmobrya* was originally proposed by Mr. Smith for Ferns with fasciculate fronds, and *Eremobrya* for those with the stipites inserted laterally on the rhizome. Mr. Moore adds, that this suggestion was followed up by Mr. Newman, who proposes the term *Eremobrya* for Ferns with lateral articulated stipites; *Chorismobrya* for those with lateral adherent stipites; *Desmobrya* for those with continuous tufted stipites; and *Orthobrya* for Ferns, such as *Botrychium* and *Ophioglossum*, whose fronds are not circinate in vernation. To me it appears that all these terms express most important characters, available for systematic purposes, and which have been too long overlooked. But I must add, that I do not find that these alone afford satisfactory characters for the construction of tribes, or, in many cases, of genera even. I am indebted to Mr. Smith's great knowledge of Ferns for very much assistance in this Natural Order, and for his ready help in many cases of difficult synonymy, and in assigning limits to the New Zealand species, about which we have, I may say in every case, arrived at the same conclusion.

Polypodieæ into those with naked and indusiate sori is to a great extent artificial; it separates *Polypodium rugulosum* and *Hypolepis tenella,* Ferns which are probably one and the same species; while *Polystichum venustum* and *Polypodium sylvaticum* also, are very nearly allied indeed; but, to have avoided this, I must either have given each species a genus to itself, or have distributed them amongst other genera, where they would never have been found by the student, and to which some of them are but doubtfully allied*.

I have adopted thirty-seven genera in all, which is one for every four species: most of these are admitted by all botanists, and five of them are broken up by most (especially *Pteris*): had I adopted all the genera that have been proposed, there would have been one for nearly every Fern in New Zealand.

In the treatment of the species I feel that I am open to more criticism, inasmuch as I have reduced so very many species proposed by excellent botanists (who have made Ferns their especial study) to varieties of better known and more widely distributed plants; I have not, however, done so without much hesitation, nor until after many years' familiarity with the species. I must refer to Chap. II. § 2. of the Introductory Essay to this Flora, for the considerations involved in this question; and I must especially repeat the fact, that I have not only gathered a large proportion of the species myself in New Zealand, but have found them in other countries, have seen them growing under Mr. Smith's care at Kew, have examined and compared far more specimens from New Zealand and elsewhere than any of my predecessors can have done, or than any of my successors are likely to have the opportunity of doing for many years to come. Of all New Zealand plants these are the most variable, and the most difficult to recognize by descriptions without plates or specimens: indeed, without access to a very extensive herbarium it is not advisable to describe supposed novelties amongst Ferns. The Natural Order is already encumbered with an unparalleled amount of synonymy; and by the time that general collections shall have been accumulated, and rendered sufficiently complete for satisfactory study, this branch of science will be rendered impracticable, except by the few proficients who have grown up with the growth of the evil: then probably a reaction will ensue, the opposite course will be too eagerly pursued, and the reduction of book species will be carried out with as unsparing a hand as is now employed in their multiplication.

There are many genera under which I have ventured upon observations that may appear to require confirmation; as when I state my suspicion that there is but one species of *Ophioglossum* of the *vulgatum* group, and one of *Botrychium* with decompound fronds, which includes *Virginicum, Australe,* and its allies. These are points upon which my own mind has long been made up, and which I have discussed with various Pteridologists, most of whom, after examining all my materials, have come to the same conclusion.

Tribe I. Gleicheniaceæ, Br.—*Capsules* 2–4, *sessile, bursting longitudinally, completely surrounded by an oblique or transverse striated ring.* Gen. I.

Gen. I. GLEICHENIA, *Smith.*

Involucrum 0, v. e margine frondis revolutæ. *Capsulæ* in quovis soro 1–6, sessiles, annulo completo cinctæ, longitudinaliter dehiscentes.

* Had Pteridologists arrived at any conclusion as to the value of the organs of Ferns in a systematic point of view, and had there been any good system of the genera published, I should have adopted it for this work, and given an artificial clavis for the student as well; but so long as one naturalist relies on the veins for characters, another on the indusium, a third on the rhizome, a fourth draws characters from the number of cells in the elastic rings of the capsules, and a fifth considers the slightest deviation from the assumed typical form of any one of these organs, as sufficient to constitute a genus, it is obvious that the science is retrograding, and must do so till more philosophical principles are adopted.

A large genus, of coriaceous, rigid, opaque Ferns, chiefly natives of the Tropics, Australia, and New Zealand: a few are found in Japan, Owhyhee, and temperate South America.—*Rhizome* creeping, often chaffy or woolly, as is the whole plant sometimes. *Stipes* erect, rigid, sometimes very tall and slender. *Frond* dichotomously branched; branches simple or pinnate. *Pinnæ* narrow, pinnatifid; the segments generally convex, sometimes with revolute margins, which form an involucre. *Sori* of 1–6 sessile capsules, that burst longitudinally, each surrounded by a complete ring, placed at the end or middle or axil of the simple or forked veinlets. The microscopic characters of a naked sorus and complete ring surrounding the sessile capsule, which bursts from the base to the apex, are certain marks of this genus. (Name in honour of *K. W. F. von Gleichen*, a German author on microscopic plants.)

§ 1. EUGLEICHENIA.—*Sorus at the apex of a veinlet. Segments of the pinnæ broad, short.*

1. Gleichenia *semi-vestita*, Lab.; fronde dichotome ramosa, ramis divaricatis pinnatis, pinnis pinnatifidis glabris, lobis subrotundis ovatisve planis concavisve, capsulis 1–4 exsertis, rachibus stipiteque superne hirtis, pilis ferrugineis rachi sæpius stellatis.—*Labill. Sert. Nov. Cal. p.* 8. *t.* 11. *Hook. Sp. Fil. v.* 1. *p.* 3. *t.* 2 *A.* G. microphylla, *Br. Prodr.*

Var. *β. hecistophylla;* pinnarum lobis valde concavis capsulas tegentibus, rachi interdum lanata.—G. hecistophylla, *A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 4. *t.* 2 *B.*

HAB. Northern Island; abundant in open Fern-lands, etc. Chatham Island, *Dieffenbach.* Nat. name, "Wae wae kaka" (*parrot's foot*), north of the Thames, and "Wae wae matuku" (*heron's foot*), south of that river, *Col.* (Cultivated at Kew.)

A common Australian and Tasmanian Fern, which I cannot distinguish from *G. semi-vestita*, Lab., of New Caledonia and the Malay Islands, but Australian specimens of which have hitherto been called *G. microphylla*, and New Zealand ones *G. hecistophylla.* The latter name was given to a variety having the segments of the pinnæ much more concave than usual, a character I find to be inconstant, the segments varying from quite flat with the sori exposed, to deeply concave with the sori concealed by their revolute margins.—*Fronds* 1½–3 feet high. *Rachis* terete, slender, generally smooth, often shining below, woolly or chaffy above. *Branches* dichotomous, spreading, a span to a foot long, forked and pinnate; *rachis* chaffy and covered with scattered stellate rusty-red hairs. *Pinnæ* 1½–2 inches long, ⅙ inch broad, shining above, often glaucous below, there covered with long, weak, lax deciduous hairs, or perfectly glabrous; *costa* often chaffy in the young state, smooth in the old. *Segments* broadly oblong, or rounded. *Capsules* one to four.

2. Gleichenia *dicarpa*, Br.; fronde dichotome ramosa, ramis divaricatis pinnatis, pinnis pinnatifidis subtus densissime ferrugineo-lanatis squamosisque glabratis glaberrimisve, segmentis orbiculatis saccatis lato margine cinctis, capsulis binis, rachi costaque lanatis paleaceisque rarius glabratis.—*Br. Prodr. Hook. Sp. Fil. v.* 1. *p.* 3. *t.* 1 *C. Kunze, Farnkr. p.* 164. *t.* 70. *f.* 2.

Var. *β. alpina;* minor, densius ferrugineo-lanata et paleacea.—G. alpina, *Br. et Hook. l. c. Hook. et Grev. Ic. Fil. t.* 58.

HAB. Middle Island: Foveaux Straits, *Lyall.* Var. *β.* Taupo Lake, in dense tufts, *Colenso.*

This is a rather common Tasmanian plant, also found in Bass's Straits, and varies extremely in the amount of woolly clothing it bears. Sometimes the whole plant, from the rhizome upwards, is clothed with a soft brown wool and chaff (such is especially the case with alpine specimens); at other times the plant is nearly glabrous throughout, and the under surface of the lobes is glaucous. Tasmanian specimens attain nearly as large a size as *G. semi-vestita*, my New Zealand ones are smaller and more slender. The pinnæ are more slender than in *G. semi-vestita*, and the saccate lobes, which look like closed boxes with transverse slits, at once distinguish this specifically. I have in vain attempted to distinguish *G. alpina* as a species; it is certainly only an alpine, and consequently stunted, and often woolly state of *G. dicarpa.* I have not only gathered these varieties passing into one another, but Mr. Gunn's

magnificent suites of Tasmanian specimens show every transition state; and Mr. Colenso's, from Taupo Plains, (which are very slender,) are intermediate in character. Some of my specimens of var. β, *alpina*, from Mount Wellington (Tasmania), are as glabrous as any of *G. dicarpa.*

§ 2. MERTENSIA.—*Sorus at the middle or fork of a veinlet. Segments of the pinnæ linear.*

3. Gleichenia *Cunninghamii*, Heward; fronde coriacea dichotome ramosa sæpe prolifera, ramis pinnisve lanceolatis linearibusve pinnatifidis, pinnulis linearibus obtusis acutisve integerrimis subtus glaucis pilosis glabratisve marginibus planis recurvisve integerrimis, capsulis 4–6 exsertis, stipite rachi costaque squamis bullatis deciduis paleacea v. nuda.—*Hew. MSS. in Hook. Sp. Fil. v.* 1. *p.* 6. *t.* 6 *B.* (TAB. LXXI.)

HAB. Northern Island, *Cunningham*, etc., as far south as Queen Charlotte's Sound, *Lyall.*

I have studied this plant under several forms, and am not satisfied of its being permanently distinct from the *G. flabellata.* The latter plant is much less coriaceous and more glabrous (characters of little importance), and has longer segments of the pinnæ, which are more or less serrated. There are specimens closely resembling this plant in Herb. Hook. from South Chili, and from Port Natal (*G. umbraculifera*, Kze.).—*Stipes* very stout, a foot long, erect, grooved down one side, pale, smooth, or sometimes covered above with large pale deciduous bullate scales, that are also found on the rachis and costa, or are wholly absent. *Branches* stout, curving, dichotomously and proliferously branched, 6–15 inches long, ½–1 inch broad, woolly at the base, rarely wholly glabrous, sometimes running out into long serrate points, pinnate below, pinnatifid above. *Segments* decurrent on the branches, coriaceous, falcate, linear, ⅓–⅔ inch long, ⅙–¼ broad, plane or with recurved or revolute margins, often glaucous below. *Capsules* two to six, generally exposed.—PLATE LXXI. Fig. 1, upper, 2, under surface of segments; 3, capsules: —*all magnified.*

4. Gleichenia *flabellata*, Br.; fronde submembranacea dichotome ramosa prolifera flabelliformi bipinnata, pinnulis ascendentibus linearibus acutis serrulatis utrinque concoloribus subtus glaberrimis pubescentibusve, capsulis 4–6 exsertis, costa rachi stipiteque nudis glaberrimis v. rarius pubescentibus.—*Br. Prodr. Lab. Sert. Aust. Caled. p.* 9. *t.* 12. *A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 6.

HAB. Northern Island, in shaded woods: Bay of Islands, *A. Cunningham*, etc. (Cultivated at Kew.)

Also found in Australia and Tasmania, and in New Caledonia. A much larger plant than *G. Cunninghamii*, 2–4 feet high, with larger, broader, more membranous and proliferous fronds, having several tiers of branches rising above one another.—*Pinnules* narrow, long, serrate, green on both sides. *Stipes, costa*, and *rachis* without bullate scales.

OBS. *G. Hermanni*, Br. (*Polypod. dichotomum*, Forst. Prodr.), is introduced into A. Cunningham's Prodromus on Forster's authority, who states that the roots are eaten roasted. I have no reason to suppose *G. Hermanni* to be a New Zealand plant, and much to suspect some mistake in this case, having several times found discrepancies between the naming of the species in Forster's several Herbaria, and between these and his Prodromus; his habitats too are sometimes erroneous. Forster no doubt refers to one of the New Zealand species as the esculent of that country.

Tribe II. CYATHEÆ.—*Sorus globose. Capsules with an incomplete vertical ring, sessile or stalked, placed on an elevated receptacle, often mixed with jointed hairs.* Gen. II. to IV.

Gen. II. CYATHEA, *Sm.*

Sori dorsales, globosi, receptaculo globoso v. clavato siti. *Involucrum* globosum, primum clausum, membranaceum v. corneum, demum apice lacero dehiscens v. basi rupta sorum nudans, cyathiforme. *Venæ* liberæ, furcatæ v. simplices.—Caudex *sæpius arborescens.*

A large genus of arborescent Ferns, natives of Tropical and South Temperate countries generally.—*Sori* at the back of the segments, removed from their margin, of numerous capsules, forming a globose mass on an elevated or club-shaped receptacle, enclosed in a spherical, coriaceous, or membranous involucre, which bursts from the base or irregularly from the top, and finally forms a more or less complete cup round the sorus. (Name from *κυαθος, a cup.*)

1. Cyathea *medullaris,* Sw.; arborea, stipite rachibusque muricatis, fronde coriacea 2–3-pinnata, pinnulis sessilibus late lanceolatis acuminatis profunde pinnatifidis glabris subtus sparse paleaceis, segmentis linearibus oblongisve obtusis crenato-serratis rarius integerrimis inferioribus pinnatifidis, soris latiusculis lobulis pinnulorum recurvis sitis, involucro membranaceo demum 3–4-lobo fimbriato-lacero.—*Schkuhr, Fil. f.* 133. *Hook. Sp. Fil. v.* 1. *p.* 27. *A. Cunn. Prodr. A. Rich. Flora.* Polypodium medullare, *Forst. Prodr.*

Hab. Northern and Middle Islands, as far south as Akaroa, *Raoul.* Nat. name, "Korau" of the northern tribes, "Mamaku" of the southern, *Col.* (Cultivated at Kew.)

A very noble Tree-fern, the succulent pith of which is the best food of the kind which the New Zealand forests afford. It is also a native of Norfolk Island, and probably of New Guinea, Otaheite, the Coral Islands, and Bonim, whence fronds have been brought, hardly differing from those of the New Zealand plant, but the nature of whose trunks is unknown.—*Trunk* 12–14 feet high, 6 to 8 in circumference, rough from being covered with the black bases of the stipites. *Fronds* very numerous, 18 feet long, erecto-patent, tripinnate, coriaceous, deep green above, pale beneath. *Stipes* and *rachis* covered with little scattered tubercles. *Pinnules* sessile, linear, 4–6 inches long, $\frac{3}{4}$–$1\frac{1}{4}$ broad, acuminate, pinnatifid to the costa, pinnate towards the base, glabrous or covered with ciliated scales. *Segments* linear, falcate, acute, $\frac{1}{2}$ inch long, $\frac{1}{10}$–$\frac{1}{8}$ broad, crenate-serrate; the lower segments pinnatifid. *Sori* numerous, one on each tooth of the segment, whose recurved margin partly hides it. *Involucre* irregularly split to the base into several torn segments. *Capsules* mixed with hairs.—In barren fronds the segments are broader and obscurely toothed.

2. Cyathea *dealbata,* Sw.; arborea, rachi costaque pube decidua vestita, fronde bipinnata, pinnulis sessilibus lineari-lanceolatis acuminatis profunde pinnatifidis basi pinnatis subtus glaucis, segmentis lineari-oblongis obtusis falcatis serratis, soris inter marginem costamque medio sitis, involucro globoso membranaceo demum lacero.—*Swartz, Syn. Fil. A. Rich. Flor. p.* 77. *t.* 10. *A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 27.

Hab. Throughout the Northern Island, and in the north parts of the Middle Island, *Banks and Solander, etc.,* as far south as Akaroa, *Raoul.* Nat. name, "Ponga," *Col.* (Cultivated at Kew.)

The tallest and most graceful Tree-fern of New Zealand, conspicuous for the milk-white under-surface of the fronds; often forming groups: it grows in no other part of the world.—*Trunk* sometimes branched, 40 feet high, slender, dark-coloured. Mr. Edgerley says that the pith is eaten like that of *C. medullaris,* but the statement wants confirmation. *Fronds* bipinnate; rachis and midrib of the pinnules covered with a soft pale deciduous down. *Stipes* and *rachis* slender. *Pinnæ* 1–$1\frac{1}{2}$ feet long, green above, white and very glaucous below. *Pinnules* linear-lanceolate, 2–4 inches long, acuminate or caudate, $\frac{1}{2}$–$\frac{3}{4}$ inch long, pinnatifid, and pinnate towards the base. *Segments* close set, linear-oblong, blunt, serrate. *Sori* pale brown, numerous. *Involucre* membranous, lacerated. *Receptacle* pubescent.

3. Cyathea *Cunninghamii,* Hook. fil.; rachi submuricata, fronde tripinnata flaccida, pinnulis sessilibus lineari-elongatis obtusis pinnatifido-lobatis, lobulis rotundatis glaberrimis, involucris demum laceris v. hemisphæricis margine subintegris, rachi costaque supra strigoso-pubescentibus infra tomentosis squamosisque rarius glabratis glaberrimisve punctis minimis muricatis.—*Nob. in Hook. Ic. Plant. t.* 985.

Hab. New Zealand, *Forster.* Northern Island: Wycari River, Bay of Islands, *A. Cunningham.* Mountains of the east coast and interior, *Colenso.* Auckland, *Sinclair.* Nat. name, "Punui," *Col.*

The finest specimen of this which I have seen is a portion of a frond with the main rachis, gathered by Cunningham, and now in Mr. Heward's Herbarium. Forster's is a single pinna in the Hookerian Herbarium. Mr. Colenso's specimens are smaller and in a younger state; Dr. Sinclair's are very glabrous throughout. All these are intermediate between *C. medullaris* and *C. Smithii*, differing from the former in the flaccid, membranous, pale green fronds, which are more or less pubescent and scaly along the partial rachis and costa beneath, and from the latter in the longer pinnules. The *involucre* is sometimes irregularly torn from the top; at others, and apparently more frequently, it separates from the base on one side and turns back against the frond as a shallow cup, exactly as in the *C. Smithii*: both states of involucre occur on the same frond. *Main rachis* muricated with minute scattered raised points.

4. Cyathea *Smithii*, Hook. fil.; arborea, stipite basi paleis rigidis elongatis serrulatis dense crinito superne glabrato, rachi costaque infra sparse pilosis pilis laxis rufis deciduis ornatis supra strigoso-villosis, fronde bipinnata, pinnis primariis lineari-elongatis, secundariis sessilibus linearibus lineari-oblongisve subacuminatis profunde pinnatifidis basi pinnatis, segmentis lineari-oblongis acutis subfalcatis serratis crenatisve supra glaberrimis infra costa basi paleacea pilosa v. glabrata, soris ad angulum venæ furcatæ insertis, indusio hemisphærico. (TAB. LXXII.)

HAB. Northern Island; mountains of the east coast and interior: Tehawera, Tararua, and Ruahine range, *Colenso*; Wellington, *Sinclair*; Middle Island, *Lyall*.

A beautiful Tree-fern, discovered by Mr. Colenso, who says that the trunk attains 24 feet in height, and is rough with the persistent bases of the stipes. Dr. Sinclair's specimens are old and almost entirely glabrous.—*Fronds* very delicate and beautiful, 6–7 feet long, used by the natives to ornament their meeting-places, etc. *Young stipes* at the base densely clothed with a thick brush of long, shining, rigid, dark brown, linear-subulate paleæ, 1½ inch long; these are shorter, broader, and curved on the old stipes. *Main rachis* pale, quite smooth, as are the partial ones towards their bases on the under surface of the frond, more or less hairy or paleaceous towards the ends of the pinnæ, as are the midribs of the pinnules. *Pinnæ* 12–15 inches long, 4–5 broad, deep green and glabrous above, except along the rachis and costa, which are densely pubescent or strigose, paler green below. *Secondary pinnæ* 2–2½ inches long, ½ inch broad, deeply pinnatifid, pinnate at the base. *Segments* linear-oblong, acute, slightly curved, coarsely toothed. *Sori* at the fork of a vein. *Receptacle* club-shaped, glabrous. *Involucre* a small shallow cup, that covers the sorus in a very young state, bursts transversely externally on one side, and then becomes reflected against the frond, as in *Hemitelia*, from which genus it differs in habit and in the young involucre covering the sorus. (Named in honour of *Mr. J. Smith*, the able curator of the Royal Gardens at Kew, who is no less distinguished for his knowledge of this Natural Order, than for the skill and zeal which he has devoted to the collection of living Ferns in those gardens, which is incomparably the finest and richest in Europe.)—PLATE LXXII. Fig. 1, part of stipes; 2, scale from the same; 3, pinnule with sori; 4, receptacle and involucre:—*all magnified.*

Gen. III. ALSOPHILA, *Br.*

Sori dorsales, globosi. *Receptaculum* prominulum. *Involucrum* 0. *Venæ* pinnatæ, liberæ, simplices v. furcatæ.—Caudex *sæpius arborescens.*

A very large genus of tropical Tree-ferns, of which more than fifty species are enumerated, but few of which grow in the south temperate zone: of these one is an Australian plant, found also on the north coast of Tasmania, and another is the *A. excelsa* of Norfolk Island, which is the loftiest of Tree-ferns, and said to attain 80 feet, and the third is the plant here described. The genus is distinguished from the two preceding by the absence of any involucre, and from *Polypodium* by the arborescent habit and elevated receptacle of the sorus. The latter often bears long jointed hairs amongst the capsules. (Name from αλσος, *a grove*, and φιλω, *to love.*)

1. Alsophila *Colensoi*, Hook. fil.; arborea, fronde gracili bipinnata submembranacea, rachi costaque superne laxe paleaceo-pilosa subtus pilosa squamisque bullatis membranaceis deciduis ornata, pinnulis

lineari-lanceolatis profunde pinnatifidis supra glabris, segmentis lineari-oblongis obtusis subcrenatis, soris medio venæ v. ad angulum venæ furcatæ sitis, capsulis pilis laxis elongatis immixtis. (TAB. LXXIII.)

HAB. Northern Island: Ruahine range, *Colenso.*

A very beautiful and delicate-fronded Tree-fern, of some specimens of which Mr. Colenso remarks that they never produce an arborescent caudex, whilst of others that the trunk is 4–5 feet high. The young fronds are thickly covered with long, weak, lax, rusty-brown hairs, mixed on the under surface with bullate, ovate, membranous, fimbriated scales, that end in hair-like points; beneath these there is more or less of a reddish stellate down: this clothing is deciduous, but some of it remains in all states of the plants.—*Frond* apparently 3–4 feet long, and bipinnate; rachis weak. *Pinnæ* 12 inches long and 4 broad, lanceolate, acuminate. *Pinnules* distant, $1\frac{1}{2}$–2 inches long and $\frac{1}{3}$–$\frac{2}{3}$ broad, acuminate, deeply pinnatifid. *Segments* linear-oblong, nearly straight, blunt, and bluntly toothed. *Sori* very numerous and prominent, often occupying the whole segment. *Capsules* raised on a club-shaped receptacle, mixed with long, weak, jointed hairs.—I have dedicated this beautiful Fern to its zealous discoverer.—PLATE LXXIII. Fig. 1, scale of costa; 2, segment; 3, portion of the same; 4, capsules; 5, jointed hairs of receptacle:—*all magnified.*

Gen. IV. DICKSONIA, *L'Hérit.*

Sori marginales, globosi. *Receptaculum* prominulum. *Involucrum* bivalve; *verum* e apice venulæ ortum, extus liberum; *spurium* e lobulo pinnulæ reflexo, alterum equitans. *Venæ* simplices v. furcatæ.—Caudex *sæpius arborescens.*

A large genus of Ferns: many are arborescent, as the beautiful *D. Antarctica*, the handsomest of all Tree-ferns, whose trunk attains in Tasmania a girth of 12 feet throughout its height of 40.—*Sori* on the margins of the pinnules. *Capsules* on an elevated receptacle, enclosed in a two-valved involucre. *Inner valve*, or true involucre, coriaceous, but less so than the outer, arising from the end of a vein; *outer*, the recurved segment or tooth of the pinnule opposite the inner. (Named in honour of *Mr. James Dickson*, a Scotch botanist.)

1. Dicksonia *squarrosa*, Sw.; stipite nigro rachibusque tuberculis asperis, partialibus costisque supra laxe pilosis subtus subhispidis, fronde bi-tripinnata coriacea, pinnis longe acuminatis, pinnulis lineari-elongatis breve stipitatis sessilibusve supra glaberrimis subtus ad costam laxe pubescente-pilosis glabratisve sterilibus pinnatifidis fertilibus pinnatis, segmentis lineari-oblongis subpungentibus argute profunde dentatis fertilibus contractis dentibus omnibus soriferis, involucri valvis æqualibus.—*Swartz, Syn. Fil. Schkuhr, Fil. p.* 124. *f.* 130 (barren frond). *Hook. Sp. Fil. v.* 1. *p.* 68. Trichomanes squarrosum, *Forst. Prodr.*

HAB. Throughout the Islands; abundant from the Bay of Islands to Dusky Bay, *Banks and Solander, etc.* Nat. name, "Weki," *Col.* (Cultivated at Kew.)

A very handsome Tree-fern, the most southern in the world, often growing in groups, with a trunk 10–15 feet high, rough from the persistent bases of the black stipites.—*Young stipes* clothed at the base with soft, pale brown wool; old stipes, rachis, and midribs of the pinnæ rough with little tubercles, black on the lower surface, paler above; partial rachis and ribs on both surfaces covered more or less with deciduous spreading hairs and chaff, which fall away from the old specimens. *Fronds* very rigid and coriaceous, 10 feet long, twice or thrice pinnate. *Pinnæ* 12–20 inches long, 4–6 broad, with long acuminate points or tails. *Pinnules* often stipitate, linear-elongate, acuminate, 3–4 inches long, $\frac{1}{2}$–$\frac{3}{4}$ inch broad, barren ones less rigid and pinnatifid, fertile narrower and pinnate. *Segments* short, oblong, stiff, $\frac{1}{4}$–$\frac{1}{3}$ inch long, with pungent points, deeply crenate-toothed. *Sori* very numerous and large, generally occupying every tooth of every pinnule throughout a great portion of the frond, whose whole surface they thus cover with a rich brown tint. *Valves* of the involucre hemispherical, nearly equal.

2. Dicksonia *Antarctica*, Br.; stipite rachique lævi, partialibus costisque molliter patentim pilosis demum glabratis, fronde coriacea bipinnata, pinnis lineari-elongatis longe acuminatis, pinnulis sessilibus

profunde pinnatifidis linearibus acutis, segmentis brevibus pungentibus grosse argute serratis, soris quovis lobulo sub-4, involucri valvis æqualibus. D. fibrosa, *Colenso in Tasm. Journ. Hook. Sp. Fil. v.* 1. *p.* 68. *t.* 23 B.

HAB. Northern Island: East Coast, Wairarapa Valley, Te-waiite, and Mohaka, *Colenso.* Nat. names, "Weki-ponga" and "Tuhirunga," *Col.* (Cultivated at Kew.)

This, the *D. Antarctica* of Tasmania, has the trunk covered with matted rootlets, which increase its bulk considerably, to 20 inches in New Zealand according to Mr. Colenso, who alone has gathered this species there, and to 4 feet in Tasmania, where its trunk attains 40 feet elevation. Mr. Colenso adds that it grows 18 feet high, that the fibrous coat is sliced and used in constructing houses, etc., that the fronds spread and are very few in number.—*Stipes* smooth, pale, glabrous; partial rachis and midribs on both surfaces more or less clothed with soft spreading hairs, which are very deciduous. *Fronds* apparently 6–8 feet long, lanceolate, narrowed downwards, bipinnate, less coriaceous than in *D. squarrosa. Pinnæ* 10 inches long, 1½ inch broad, narrowed into long tips. *Pinnules* sessile, ¾–1 inch long, linear or linear-oblong, acute, pinnatifid, the barren ones cut beyond the middle, the fertile to the base. *Segments* oblong, sharp, and sharply toothed. *Sori* about four on each segment; *valves* of the involucre hemispherical, equal.—If this differs from *D. Antarctica* in any particular, it is in the more hairy rachis and sharper lobes of the segments in some of the specimens; but neither Sir W. Hooker, Mr. J. Smith, nor I, can point out any difference whatever between the majority of the New Zealand and Tasmanian individuals.

3. Dicksonia *lanata,* Col.; stipite glaberrimo lævi basi pilis ferrugineis brunneisve molliter lanato et crinito, rachibus lanatis glaberrimisve, fronde coriacea bipinnata ovato-lanceolata, pinnis oblongo-lanceolatis acuminatis, pinnulis sessilibus sterilibus pinnatifidis fertilibus pinnatis contractis, segmentis breviter oblongis obtusis pungentibusve obtuse et profunde 2–4-crenatis v. lobatis, soris sub-4 segmenta occludentibus, involucris subæqualibus hemisphæricis.—*Colenso in Tasm. Journ. Hook. Sp. Fil. p.* 69. *t.* 23 *C.*

HAB. Northern Island: Bay of Islands, east coast and interior, *Cunningham, Colenso, etc.*

A very variable species in size and amount of woolly hairs on the rachis and midribs of the pinnules, the hairs being sometimes copious and matted into a soft yellow-brown wool, at others wholly absent, when the plant is perfectly glabrous. Like very many other Ferns, and some of its congeners in various parts of the world, the development of its caudex is far from constant. The trunk sometimes rises four feet high, but generally it is quite inconspicuous or absent; indeed the habit of the plant is not that of a Tree-fern, and Mr. Colenso remarks that at Lake Taupo it covers the ground, growing like *Pteris.* Having examined the plant in its native state, I have no hesitation in referring the stemless to the subarboreous species.—*Fronds* 1–7 feet long, of a very coriaceous, thick, but not rigid texture, bi-tripinnate, broadly lanceolate or ovate. *Stipes* clothed at the base with long, dark brown, purplish, or yellowish, soft silky hairs, ¾ inch long; upper parts of stipes and main rachis quite smooth and glabrous. *Pinnæ* 5–14 inches long, oblong-lanceolate, acuminate. *Pinnules* sessile, 1½–3½ inches long, linear, acuminate; barren ones pinnatifid to beyond the middle; fertile much contracted, pinnate. *Segments* short, oblong, blunt, or ending in a short pungent point; margin deeply cut into about four very blunt soriferous teeth. *Sori* covering the whole under surface of the frond. *Involucre* of two nearly equal hemispherical valves.

Tribe III. HYMENOPHYLLEÆ.—*Sorus at or beyond the edge of the frond. Capsules sessile, on a filiform or club-shaped, often elongated, receptacle, girt with an oblique ring. Frond very delicate, transparent, and reticulated* (*except in* Loxsoma). Gen. V. to VII.

Gen. V. HYMENOPHYLLUM, *Sm.*

Sori marginales. *Capsulæ* receptaculo cylindraceo fronde immerso v. exserto subsessiles, depressæ, annulo completo transverse cinctæ, longitudinaliter ruptæ. *Involucrum* textura frondis, bivalve, urceolatum

v. compressum, valvis planis v. convexis, extus liberis.—Frondes *membranaceæ, pellucidæ, cellulis magnis reticulatæ, costa valida percursæ.*

One of the largest and most beautiful genera of Ferns, generally of small size, easily recognized (except from *Trichomanes* and *Todea*) by the transparent pellucid texture of the delicate green glistening fronds, which are beautifully reticulated under the microscope. Upon the whole, the New Zealand species are the finest in the genus: they almost invariably grow in damp forests.—*Rhizoma* slender or stout, wiry, filiform, creeping. *Fronds* generally glabrous, often flaccid, pinnately or pinnatifidly divided into linear, blunt, dichotomously branched segments, through which runs a stout midrib. *Sori* at the axils or ends of the segments, sunk in the substance of the frond, which forms a cup-shaped or box-like, often flattened, two-valved involucre over them. Sometimes the involucre is produced beyond the frond and stalked; its two valves or lips are entire or toothed, and open outwards. *Capsules* sessile, on a filiform or cylindrical receptacle, that is sometimes exserted, like a thread, beyond the involucre; sessile, depressed, surrounded with a complete ring, and bursting longitudinally. (Name from ὑμην, *a membrane*, and φυλλον, *a leaf*.)

§ A. *Fronds quite glabrous; margins toothed or serrate, not ciliate.*

1. Hymenophyllum *Tunbridgense,* Sm.; parvulum, frondibus cæspitosis erectis curvis depressisve ovatis linearibusve pinnatis, pinnis verticalibus glaberrimis pinnatifidis, laciniis late linearibus simplicibus bifidisve spinuloso-dentatis, involucris supra-axillaribus solitariis subcompressis basi cuneata fronde immersis, valvis erosis v. spinuloso-dentatis, rachi superne alata.—*Smith, Fl. Brit. Engl. Bot. t.* 162. *A. Rich. Flor. A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 95.

Var. β. *cupressiforme;* fronde elongata erecta rigida, pinnis distantibus decurvis, segmentis angustissimis, involucris lobulo frondis quasi stipitatis liberis.—*Hook. Sp. Fil. l. c.* H. cupressiforme, *Lab. Fl. Nov. Holl. p.* 102. *t.* 250. *f.* 2. H. Tunbridgense, *Br. Prodr.* H. revolutum, *Col. in Tasm. Phil. Journ.*

Hab. Throughout the Islands; from the Bay of Islands, *Cunningham, etc.*, to the Southern Island, *Lyall.* Growing on rocks and roots of trees, etc. (A native of England.)

This is a scarce English Fern, and a great favourite with cultivators. Dr. Lyall's specimens precisely resemble the English in their pale glistening green hue, short ovate fronds, 1–2 inches long, and broad segments; but the more common state of this species in New Zealand, Tasmania, and other regions, has a narrower and more decumbent frond, often remarkably curved downwards on to the ground, and narrower segments. It has been found in many temperate and some tropical latitudes, the Azores, Madeira, South Africa, North India, Chili, Brazil, and Tasmania.—*Fronds* ovate or linear, pinnate below, pinnatifid (rachis winged) above, quite glabrous. *Pinnæ* closely imbricated or distant; segments long or short, spreading or curved downwards, deeply sharply toothed. *Involucre* orbicular, compressed, at the axils of the segments, erect, projecting beyond the frond, in which their bases are sunk, their lips spinulose or irregularly toothed.—The var. β is a taller, erect plant, sometimes 3½ inches high, with very narrow, distant, decurved, rigid pinnæ, whose margins are often recurved, and the involucres hence project conspicuously upwards from the frond. It differs from *H. unilaterale,* Willd., only in the spinulose lips of the involucre.

2. Hymenophyllum *unilaterale,* Willd.; frondibus cæspitosis lineari-oblongis pinnatis erectis decurvisve, pinnis distantibus decurvis margine superiore præcipue parce pinnatifidis, segmentis linearibus argute dentatis simplicibus pinnatifidisve, involucris supra-axillaribus liberis obovato-oblongis tumidis, valvis integerrimis, rachi superne alata. H. unilaterale, *Willd. Sp. Pl. v.* 5. *p.* 521. H. Wilsoni, *Hook. Brit. Fl. Sp. Fil. v.* 1. *p.* 95. *Wils. in Engl. Bot. Suppl. t.* 2686. H. Tunbridgense, β, *Kunze, Plant. Afr. Aust.*

Hab. Northern Island: ascent of the Ruahine mountains, *Colenso.* (A native of England.)

Apparently a scarce plant in New Zealand, but abundant in Tasmania, Fuegia, and Chili; found also in South

Africa, and very many other parts of the globe. It differs from *H. Tunbridgense*, β *cupressiforme*, only in the entire lips of the involucre, otherwise these plants appear identical. I find the amount of toothing in the valves of *H. Tunbridgense* to vary extremely, sometimes amounting to a mere erosion, and at others the lips being even laciniated and spinulose; so that I can hardly doubt these two proving eventually the same species. The ordinary short, broad, oblong, flat, bright-green fronded state of *H. Tunbridgense*, with broad, short pinnæ and segments, and involucres more sunk in the segments, is a different-looking form from its deep green, sparingly branched var. β, and from *unilaterale*, and nothing can be more different than the habit of such states of *Tunbridgense*, and of *H. unilaterale*, as cultivated together in a Ward's case; but in nature these characters vary and elude our grasp, and this in whatever parts of the world they both inhabit.

3. Hymenophyllum *minimum*, A. Rich.; pusillum, cæspitosum, fronde glaberrima late ovata falcato-recurva pinnatifida basi pinnata, pinnis integris bi-tripartitisve linearibus obtusis ciliato-dentatis concavis rigidis, involucris terminalibus exsertis stipitatis obovato-cuneatis, valvis dorso spinuloso-dentatis, ore breviter bilobo argute dentato.—*A. Rich. Flor. p.* 93. *t.* 14. *A. Cunn. Prodr. Flor. Antarct. p.* 103.

Hab. Throughout the Islands; on the roots of trees, etc., scarce, *D'Urville, Lyall, etc.*

A very small plant, closely allied to *H. Tunbridgense* and *H. multifidum*, differing from the former in the spinulose back of the valves of the involucre, and from the latter in this latter character and their serrate lips. This species extends as far south as Lord Auckland's Group.

4. Hymenophyllum *multifidum*, Sw.; fronde glaberrima erecta v. decurva late ovata bi-tripinnatifida, segmentis anguste linearibus sæpius decurvis rigidis spinuloso-dentatis, involucris supra-axillaribus liberis obovato-oblongis urceolatisve obtusis turgidis fere ad medium bifidis, valvis integerrimis serratisve, receptaculo valido exserto, rachi basi vix alata, stipite tereti.—*Swartz, Syn. Fil. Hook. Sp. Fil. v.* 1. *p.* 98. *Schkuhr, Fil. t.* 135 b. *Hook. et Grev. Ic. Fil. t.* 167. Trichomanes, *Forst.* T. macilentum, *Banks et Sol. MSS.*

Hab. Abundant throughout the Islands, *Banks and Solander, etc.*

Fronds 2–8 inches long, rigid, broadly ovate, twice or thrice pinnated. *Segments* spreading or curved downwards, narrow, deeply toothed. *Involucres* axillary, erect or decurved, nearly free, urceolate or obovate, two-lipped to the middle. *Lips* entire or serrate. *Receptacle* exserted. *Rachis* hardly winged below. *Stipes* and *rhizome* wiry, rounded.—This Fern is found as far south as Campbell's Island.

5. Hymenophyllum *bivalve*, Sw.; fronde glaberrima erecta v. decurva ovata tripinnatifida, segmentis linearibus dentatis, involucris terminalibus late ovatis ad medium bifidis, valvis integerrimis, receptaculo incluso, rachi inferne vix alata, stipite tereti.—*Sw. Syn. Fil. Schkuhr, Fil. t.* 135. *Hook. Sp. Fil. v.* 1. *p.* 98. *t.* 35 D. *A. Rich. Flora.* H. spathulatum, *Col. in Tasm. Journ. of Science.* Trichomanes, *Forst. Prodr.* T. pacificum, *Hedw. Fil.*

Hab. Northern Island; east coast and interior, *D'Urville, Colenso.* Middle and Southern Islands, *Forster, Lyall.*

A scarce Fern, unknown in the warmer parts of New Zealand; it closely resembles *H. multifidum* in size, habit, and general appearance, but is not so rigid, has less sharply toothed segments, and shorter terminal involucres, whose base is sunk in the frond, and the lips are quite entire.

§ B. *Fronds quite glabrous, or with the costa and rachis only setose; margins neither toothed nor ciliated.*

a. *Fronds pinnatifid, rarely pinnate below; rachis, and generally the stipes, winged.*

6. Hymenophyllum *rarum*, Br.; fronde pendula tenera oblongo-ovata v. lineari-elongata glaberrima bipinnatifida v. basi pinnata, segmentis brevibus planis latis integerrimis, involucris late ovatis rhombeisve terminalibus fronde immersis compressis, valvis latis brevibus integerrimis, stipite rachique capillari.—*Br.*

Prodr. Hook. Sp. Fil. v. 1. *p.* 101. H. semi-bivalve, *Hook. et Grev. Ic. Fil. t.* 83. *A. Rich. Flora. A. Cunn. Prodr.* H. fumarioides, *Bory in Willd. Sp. Pl.* H. imbricatum, *Col. in Tasm. Phil. Journ.*

HAB. Throughout the Islands; common, *Menzies, etc.* Southern Island, *Lyall.*

A very beautiful Fern, common in Tasmania, South Chili, and Fuegia; found also in South Africa, Ceylon, and the Malay Peninsula, varying extremely in size and habit wherever found; it clothes trunks of Tree-ferns in Tasmania with a glistening garment of the most delicate and beautiful green, the fronds hanging down and overlapping one another in profusion. It may be readily recognized by its hair-like stipes and rachis, transparent membranous fronds, and broad, short, terminal involucres.—*Fronds* 1–8 inches long, broad or narrow, linear, bipinnatifid. *Pinnæ* short, often very irregular and unequal, distant, or close and overlapping one another. *Segments* short, broad. *Involucres* rhomboid, wholly sunk in the ends of the segments, very flat, with short, broad, entire lips.

7. Hymenophyllum *pulcherrimum,* Col.; elatum, fronde ampla glaberrima membranacea ovato-lanceolata tri-quadripinnatifida, segmentis patentibus breviusculis linearibus marginibus planis v. undulatis, involucris parvis liberis axillaribus v. segmentis brevibus terminalibus sessilibus orbicularibus compressis fere ad basin bifidis, valvis latis integerrimis, stipite rachique valida ad basin alata, rhizomate brevi crasso pilis rigidis vestito, radicibus lanatis.—*Colenso in Tasm. Phil. Journ. Hook. Sp. Fil. v.* 1. *p.* 103. *t.* 37 *A.* (TAB. LXXIV.)

HAB. Northern Island: mountains of the East Coast and interior, *Colenso.* Southern Island, pendulous from trees, *Lyall.*

A very handsome species, conspicuous for the very stout rachis and stipes, the latter winged to the base, for the very short rhizome, which is clothed with dark brown shining bristles, and the woolly root-fibres.—*Frond* 12–18 inches high, broadly ovate or linear-oblong, twice or thrice pinnatifid. *Primary branches* (pinnæ) spreading, long; secondary (pinnules) short, cut into alternate, linear, blunt, membranous segments. *Involucres* small for the size of the plant, quite orbicular, free, axillary or terminating short segments, divided nearly to the base; the lips quite entire.—PLATE LXXIV. Fig. 1, portions of frond; 2, involucre with one valve removed; 3, receptacle; 4, capsules; 5, spores:—*all magnified.*

8. Hymenophyllum *dilatatum,* Sw.; elatum, erectum pendulum v. decurvum, fronde ampla ovata v. lineari-oblonga glaberrima tripinnatifida, pinnis (ramis primariis) ovatis ovato-lanceolatisve secundariisque (pinnulis) basi cuneatis subflabellatim lobatis, segmentis late linearibus cernuis sæpe caudatis, involucris terminalibus orbiculatis infra medium cuneatis fronde immersis segmento latioribus profunde bifidis, valvis integerrimis, rachi stipiteque valida fere ad basin alatas, rhizomate valido elongato glaberrimo.—*Sw. Syn. Fil. Schkuhr, Fil. t.* 135. *Hook. et Grev. Ic. Fil. t.* 60. *Hook. Sp. Fil. v.* 1. *p.* 104. *A. Cunn. Prodr.* Trichomanes, *Forst.* Leptocionium sororium, *Presl, Epimel. p.* 22. *t.* 2.

HAB. Throughout the Islands, abundant, *Banks and Solander, etc.* Southern Island, *Lyall.*

A magnificent Fern, the noblest of the genus, and a very common one in New Zealand, also found in Java and in Lord Auckland's Island. It resembles *H. pulcherrimum* in many respects, but differs remarkably in its brighter green colour, narrower, often decurved fronds, quite glabrous, elongated rhizome, and root-fibres, less winged stipes, shorter pinnæ, often tailed segments, which are much broader, and in the terminal and larger involucres. It often attains 1½ foot in height.

9. Hymenophyllum *crispatum,* Wall.; erectum, fronde ovata v. lineari-ovata bi-tripinnatifida, segmentis linearibus planis undulatisve, involucris terminalibus liberis sessilibus ovatis turgidis ad basin partitis, valvis integerrimis erosisve, rachi stipiteque late alatis ala plana undulata v. crispata.—*Wall. Cat. Hook. et Grev. Ic. Fil. t.* 77. *Hook. Sp. Fil. v.* 1. *p.* 105. H. flabellatum, *Br. Prodr. non Lab.* H. atro-virens, *Col. in Tasm. Phil. Journ.* H. flexuosum, *A. Cunn. Prodr. Hook. Sp. Fil. l. c. Ic. Pl. t.* 962.

HAB. Northern Island, scarce: Bay of Islands and East Coast, *Cunningham, Logan, Colenso, etc.*

Rather a rare New Zealand Fern, but a very common Tasmanian one; also found in the Malay Islands, Ceylon, and the Indian mountains.—*Fronds* 2–8 inches high, erect, lurid green. *Frond* erect, bi-tripinnatifid. *Segments* linear, $\frac{1}{10}$ inch broad, flat, undulated or crisped. *Involucres* often very numerous, terminal, ovate, turgid, broader than the segments of the frond, deeply divided into two valves, whose lips are quite entire or erose. *Stipes* and *rachis* with a broad, flat, or crisped wing. *Rhizome* quite glabrous, creeping.—I can detect no difference whatever between Cunningham's *H. flexuosum* and this species.

10. Hymenophyllum *polyanthos,* Sw.; erectum v. decurvum, fronde lato-ovata v. lineari-oblonga tri-pinnatifida sæpius rufo-fusca, ramis primariis (pinnis) erecto-patulis decurvisve anguste linearibus planis undulatisve, segmentis brevibus, involucris plurimis axillaribus terminalibusque liberis ovatis orbiculatisve segmentis plerumque latioribus profunde bivalvibus, valvis obtusis integerrimis erosisve rachi late alata, stipite superne alata basi nuda glaberrima v. sparsa pilosa.—*Sw. Syn. Fil. p.* 149. *Hook. Sp. Fil. v.* 1. *p.* 106.

Var. *β. sanguinolentum,* Hook. l. c.; involucris axillaribus v. segmentis brevibus terminalibus orbiculatis. H. sanguinolentum, *Swartz, Syn. Fil. Schkuhr, Fil. t.* 135 *C. A. Rich. Flor. A. Cunn. Prodr.* H. villosum, *Col. in Tasm. Phil. Journ.*

Hab. Var. *β.* Throughout the Islands, abundant.

The *H. sanguinolentum* of Swartz has been the object of repeated study by Sir W. Hooker and myself, and always with the result that it is one of the many varieties of the protean *H. polyanthos,* a plant found in all tropical countries, and everywhere most abundantly. Specimens are preserved in the Hookerian Herbarium from sixty localities and collectors, and these do not represent a hundredth part of the number of specimens I have examined. Even as a variety, *H. sanguinolentum* is not constantly distinguishable, its darker red-brown colour, flexuose main and partial rachis, and short segments, being its best diagnostic marks. Curved specimens often resemble *H. demissum,* which is a larger plant, always truly pinnate, with the rachis not winged below. Its habit, less winged stipes, flexuose rachis and often costa, and colour, best distinguish it from states of *H. crispatum.*—*Fronds* 2–6 inches high, rather rigid and opaque, of a dark reddish-brown colour, with thick midrib, bi-tripinnatifid; primary branches spreading, rarely decurved; secondary branches short, cut into few, short, linear segments. *Involucres* generally very numerous, orbicular, free, broader than the segments, split to the base; valves usually quite entire, convex. *Rachis* flexuose and winged. *Stipes* winged above, sometimes having a few scattered hairs at the base and on the rhizome, but more often quite glabrous.—The whole plant has often a peculiar odour, which it retains for some time after being dried. Raoul (in Plant. Nov. Zel.) quotes *H. Stephensonii* as a synonym of this, but I do not know where that name has been published.

b. *Frond pinnate below. Rachis not winged below.*

11. Hymenophyllum *demissum,* Sw.; elatum, erectum v. decurvum, fronde ovato-acuminata pinnata, pinnis ascendentibus bi-tripinnatifidis sæpius caudatis segmentis linearibus, involucris segmentis lateralibus terminalibusque sessilibus parvis ovatis ad basin bivalvibus, rachi superne alata inferne stipiteque nuda glaberrima.—*Sw. Syn. Fil. Schkuhr, Fil. t.* 135 *C. A. Rich. Flor. A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 109. Trichomanes, *Forst. Prodr.*

Hab. Abundant throughout the Islands, *Banks and Solander, etc.*

A very beautiful species, found as far south as Lord Auckland's Group, and as far north as the Philippine Islands. *Rhizome* wiry, creeping, glabrous. *Stipes* slender, stiff, quite glabrous.—*Frond* 4–9 inches long, 1–5 broad, deltoid or ovate-lanceolate, pinnate below, pinnatifid above. *Pinnæ* spreading, ascending, membranous, bi-tripinnatifid; the segments narrow, $\frac{1}{20}$ inch broad, the ultimate ones often elongated, the lateral bearing small, terminal, convex, ovate involucres, which are blunt and split to the base into two valves, which are rather broader than the segments.—The pinnated frond distinguishes this from *H. polyanthos,* the smooth stipes from *H. scabrum.*

12. Hymenophyllum *scabrum*, A. Rich.; erectum v. curvum, costis sæpius setoso-hispidis, fronde rigida elongato-ovata v. oblongo-deltoidea pinnata, pinnis ascendentibus bi-tripinnatifidis, segmentis linearibus integerrimis glaberrimis, involucris segmenta lateralia terminantibus orbicularibus ad basin bivalvibus, valvis integerrimis dentatisve, rachi superne alata inferne stipiteque nuda setis articulatis patulis setoso-hispida.—*A. Rich. Flor. Nov. Zeld. p.* 20. *t.* 14. *f.* 1. *A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 110. Sphærocionium glanduliferum, *Presl, Epimel. p.* 23. *t.* 12.

Hab. Northern Island: Bay of Islands, *D'Urville, Cunningham, etc.* Tehawera, East Coast, *Colenso.*

Very similar in size and general appearance to *H. demissum*, but the fronds are darker-coloured, often elongated (some of Mr. Colenso's specimens are nearly 2 feet long), and the stipes and rachis, and often the costa, are covered with deciduous, scattered, stiff, spreading, red-brown, jointed bristles. The involucres also are broader in *H. scabrum*, and generally toothed along the edge.

13. Hymenophyllum *flabellatum*, Lab.; glaberrimum, nitens, fronde pendula v. decurva lineari-oblonga rarius ovata, pinnis plerumque basi cuneatis late ovatis flabellatim dilatatis pinnatifidis v. bipinnatifidis, segmentis linearibus furcatis brevibus caudato-elongatisve, involucris segmenta lateralia terminantibus orbicularibus oblongisve ad basin fere bivalvibus, rachi superne alata inferne nuda, stipite glaberrima ima basi parce lanata.—*Lab. Fl. Nov. Holl. v.* 2. *p.* 101. *t.* 250. *f.* 1. (*non Brown Prodr.*) *Hook. Sp. Fil. v.* 1. *p.* 111. H. nitens, *Br. Prodr. Hook. et Grev. Ic. Fil. t.* 197. *A. Rich. Flor. A. Cunn. Prodr.*

Hab. Throughout the Islands, common, *Menzies, etc.*

A very beautiful small species, often clothing the trunks of Tree-ferns in Tasmania, where it is abundant, with its pale green glistening fronds; it is also found in Lord Auckland's Group.—*Rhizoma* rigid, wiry. *Stipes* 2–4 inches long, wiry, glabrous, except at the very base, where there is a tuft of soft, pale brown, woolly hairs. *Fronds* broadly ovate when erect, linear or oblong when pendulous, 2–6 inches long, pinnate below, pinnatifid above, perfectly smooth, transparent. *Pinnæ* twice pinnatifid; segments linear, quite entire and smooth, generally broadly cuneate at the base. *Involucres* small, terminal on lateral segments, orbicular or oblong; the valves entire or toothed.—The broad flabellate lower pinnæ, small size, colour, and generally woolly base of the stipes, well distinguish this from *H. demissum.*

§ C. *Costa, margins, and sometimes the surfaces of the fronds clothed with stellate hairs.*

14. Hymenophyllum *æruginosum*, Carm.; totum pilis stellatis præcipue secus costam rachim marginesque frondis vestitum, fronde pendula lineari-oblonga v. elongata pinnata, pinnis linearibus brevibus v. elongato-ovatis bipinnatifidis, segmentis approximatis linearibus, involucris terminalibus late orbiculatis semi-orbiculatisve fronde immersis, valvis brevibus pilosis.—*Carmichael in Linn. Soc. Trans. v.* 12. *p.* 573. *Hook. Sp. Fil. v.* 1. *p.* 94. *t.* 34 *A.* H. Franklinianum, *Col. in Tasm. Phil. Journ.* H. Berteroi, *Hook. Sp. Fil. p.* 93. *t.* 33 *C.* Trichomanes æruginosum, *Thouars.*

Hab. Northern Island: Waikare Lake, *Colenso.* Middle Island: Dusky Bay, *Menzies.* Southern Island, *Lyall.*

A remarkable and very beautiful Fern, discovered at Tristan d'Acunha, and found hitherto nowhere else but in New Zealand, Juan Fernandez, and Chiloe, from whence most of the specimens differ in no respects from those from Tristan d'Acunha, whilst others have rather narrower and sharper pinnæ.—*Stipes* and *rhizome* slender, hairy and woolly, or glabrous. *Frond* pendulous, 3–10 inches long, ovate-oblong, or linear and elongate, pinnate below, pinnatifid above, quite rufous when dry from the abundance of branched hairs on the rachis, costa, and margins, by which this species may be recognized at once.—Some of Dr. Lyall's specimens have twenty pairs of pinnæ on the frond.

15. Hymenophyllum *Lyallii*, Hook. fil.; pusillum, fronde pendula late oblonga v. ovato-rotundata subflabellatim v. radiatim pinnatifida marginibus pilis ramosis ciliata, pinnis linearibus dichotome divisis, segmentis obtusis, involucris late obcuneatis v. obcordatis apicibus segmentorum immersis, valvis retusis, costis stipite rhizomate radicibusque tenuissime filiformibus glaberrimis.

HAB. Middle Island: Thomson's Sound, south-west coast, *Lyall*.

A very distinct and remarkable little species, allied to *H. rarum*, Br., in habit and in the excessively slender stipes and sunk involucre. It is also nearly allied to *H. obtusum*, Hook. et Arn., of Oahu, which has more copious rufous hairs on the margins, and especially costæ, and has very different involucres.—*Fronds* pendulous, ½–2 inches long, as broad as long, rounded or oblong, pinnatifid or more usually flabellately or digitately divided from the base into sparingly branched pinnæ; segments blunt; margins ciliated with rufous branching hairs. *Involucres* cuneate, triangular or obcordate, sunk in the apex of each segment; the lips generally concave. This is probably not an uncommon plant, but overlooked, owing to its small size.

NOTE. *Hymenophyllum secundum* and *H. tortuosum*, both natives of Fuegia, have been erroneously stated (in Hook. et Grev. Ic. Fil.) to be natives of New Zealand (see Hook. Sp. Fil. v. 1. pp. 99, 106).

Gen. VI. TRICHOMANES, *Sm*.

Sori marginales. *Involucrum* tubulosum, textura frondis, basi attenuatum, apice dilatatum v. bivalve. *Capsulæ* receptaculo filiformi sæpius exserto sessiles, depressæ, annulo completo transversali cinctæ, longitudinaliter ruptæ.—Frondes *plerumque membranaceæ, pellucidæ, cellulis magnis reticulatæ*.

A more tropical genus than *Hymenophyllum*, to which alone (except *Loxsoma*) it is very closely allied, and from which it differs in the tubular or trumpet-shaped involucre, which is less obviously two-lipped, often quite circular at the mouth, and having a generally exserted filiform receptacle. (Name, an ancient one of uncertain application.)

1. Trichomanes *reniforme*, Forst.; fronde simplici reniformi, stipite elongato, involucris perplurimis marginalibus, receptaculis exsertis.—*Forst. Prodr. Hook. et Grev. Ic. Fil. t.* 31. *A. Rich. Flor. A. Cunn. Prodr. Hook. Sp. Fil. t.* 1. *p.* 115.

HAB. Throughout the Islands, common.

A very remarkable and beautiful Fern, found only in New Zealand, conspicuous for its broad, simple, kidney-shaped frond.—*Rhizome* stout, filiform, creeping. *Stipes* erect, 3–7 inches long, stout, terete. *Frond* green and transparent when fresh, brown and horny when dry, 2–4 inches broad, deeply cordate at the base, and rather decurrent on the stipes. *Veins* forked repeatedly, veinlets very rarely joining again. *Involucres* very numerous, often crowded round the edge of the frond, tubular and urceolate, with club-shaped exserted receptacles, covered with capsules.

2. Trichomanes *humile*, Forst.; cæspitosa, fronde lanceolata pinnatifida v. bipinnatifida glaberrima marginata, segmentis furcatis linearibus obtusis, involucris fronde immersis axillaribus supra-axillaribusve tubuloso-urceolatis breviter bilabiatis, receptaculo brevi v. longissimo capillari.—*Forst. Prodr. Hook. et Grev. Ic. Fil. t.* 35. *Hook. Sp. Fil. v.* 1. *p.* 123. T. Endlicherianum, *Presl, Epimel. p.* 10. *t.* 5 *A*.

HAB. Throughout the Northern Island, and as far south as Akaroa, in the Middle Island, on trunks of trees, etc. Southern Island, *Hb. A. Richard*.

A small, pale green, tufted, translucent Fern.—*Rhizome* filiform, creeping. *Stipes* slender, winged above. *Frond* very variable in shape, 1–4 inches long, linear-oblong, pinnatifid. *Pinnæ* ascending, pinnatifid or forked. *Segments* linear, blunt, margined. *Involucres* sunk in short lateral segments, hence appearing axillary, shortly two-lipped. *Receptacle* sometimes included, at others exserted like a long hair.—This species is also found in the Pacific Islands, Philippines, and West Indies. It is a variable plant: the New Zealand specimens are most irregularly

and sparingly pinnatifid, and have the involucres more sunk in the segments (or more broadly winged) than those of other parts of the world.

3. Trichomanes *venosum*, Br.; rhizomate repente filiformi, fronde parvula pendula nitida membranacea pinnata, pinnis remotis late lineari-oblongis ligulatisve simplicibus v. basi furcatis obtusis v. emarginatis margine non incrassato repandis, costa flexuosa, venis furcatis, involucris ad basin pinnarum fronde immersis liberisve tubuloso-urceolatis, ore dilatato breviter bilabiato, receptaculo plerumque capillari, rachi apice alata inferne stipiteque capillari.—*Br. Prodr. Hook. et Grev. Ic. Fil. t.* 78. *A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 132.

Hab. Throughout the Islands; on wet rocks, trunks of Tree-ferns, etc.

An extremely delicate and beautiful Fern, very common in Tasmania, and also found on the Australian mountains, often clothing Tree-ferns, as *Hym. flabellatum* and *H. rarum* do.—*Rhizome* creeping, and *stipes* capillary. *Frond* 2–5 inches long, linear, pinnate, membranous. *Pinnæ* distant, linear-oblong or strap-shaped, cuneate at the base, not margined, blunt or emarginate, waved along the edge, simple or divided at the base, $\frac{1}{2}$–$1\frac{1}{2}$ inch long, $\frac{1}{10}$–$\frac{1}{8}$ inch broad; costa flexuose, giving off branching veins. *Involucres* on the upper edge of the pinna at its base, sunk in the frond or in a lateral segment. *Receptacle* included, or capillary and exserted.—The upper pinnæ are often of irregular length, sometimes very long and caudate.

4. Trichomanes *Colensoi*, Hook. fil.; rhizomate capillari repente pilosula, fronde pendula glaberrima lineari-oblonga gracillima pinnata, pinnis stipitatis subremotis alternis lanceolatis basi pinnatis superne pinnatifidis, segmentis angustissimis subacutis membranaceis non marginatis costa percursis aveniis, involucris ad basin pinnarum solitariis stipitatis immarginatis cylindraceis, ore vix dilatato, receptaculo plerumque capillari elongato, rachi subflexuosa stipiteque capillari.—*Nob. in Hook. Ic. Plant. t.* 979.

Hab. Northern Island: dense forests near Waikare Lake, *Colenso.*

A very pretty and distinct little species, closely allied to the South American *T. trichoideum*, Sw., but differing in the sub-acute tips of the segments.—*Rhizome* creeping, filiform, slightly hairy. *Stipes* and *rachis* filiform, quite glabrous. *Frond* pendent, $1\frac{1}{2}$–3 inches long, linear-oblong, $\frac{1}{2}$–$\frac{3}{4}$ inch broad, pinnate, dark green, very membranous. *Pinnæ* five to ten pair, distant, shortly stalked, pinnate below, pinnatifid above. *Segments* without thickened edges, acute, with a costa and no nerves. *Involucres* free, stalked, erect, solitary at the base of each pinna, generally with a hair-like exserted receptacle.

5. Trichomanes *strictum*, Menz.; rigidum, erectum, cæspitosum, fronde glaberrima lanceolata stricta pinnata, pinnis approximatis ascendentibus recurvisve lanceolatis bipinnatifidis, segmentis anguste linearibus obtusis laxe reticulatis costatis aveniis, involucris liberis stipitatis urceolatis cylindraceis, ore integro, costis rachique marginata validis, stipite robusto tereti v. tenuiter marginato basi pilis brunneis vestito.—*Hook. et Grev. Ic. Fil. t.* 122. *A. Rich. Flor. A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 136. T. leptophyllum, *A. Cunn. Prodr.*

Hab. Northern and Middle Islands: Dusky Bay, *Menzies.* Hokianga, *A. Cunningham.* Massacre Bay, *Lyall.*

This appears to be a very scarce New Zealand Fern, of which there is a specimen in Hook. Herb., marked as from Otaheite.—*Fronds* densely tufted, sending out fibrous roots, not arising from an elongated rhizome. *Stipes* robust, rigid, erect, terete, slightly winged, surrounded with a tuft of red-brown shining bristles at the base. *Frond* a span long and upwards, rigid, erect, opaque, green, variable in the number, direction, and length and breadth of the divisions, lanceolate or linear-oblong, pinnate. *Pinnæ* lanceolate, ascending or recurved, bi-tri-pinnatifid, or irregularly cut into many narrow, linear, blunt or notched segments, which are $\frac{1}{4}$–$\frac{3}{4}$ line broad, furnished with a very stout midrib. *Involucres* erect, free, stalked. *Receptacle* included or exserted.

6. Trichomanes *elongatum*, A. Cunn.; rigidum, erectum, cæspitosum, fronde glaberrima ovata v.

ovato-deltoidea luride viridi bipinnata, pinnis subimbricatis patentibus ascendentibusve oblongis lineari-oblongisve basi cuneatis inciso-pinnatifidis, segmentis brevibus subacutis bifidis emarginatis integrisve, involucris perplurimis supra-axillaribus liberis cylindraceo-urceolatis, ore breviter bifido, receptaculo elongato rigido, rachi costisque validis, stipite robusto tereti.—*A. Cunn. Prodr. Hook. Ic. Plant. t.* 701. *Sp. Fil. v.* 1. *p.* 134.

HAB. Throughout the Islands; on the ground in deep shade, abundant.

A lurid-green, rigid, stout, tufted species, only found in New Zealand, whose fronds are often covered with creeping *Hepaticæ* and Mosses (*Lepidozia papillata*, and several species of *Hookeria*).—*Stipes* several together, rising from a short horizontal woody rhizome, with strong root-fibres, rigid, stout, erect, 3–6 inches long, slightly hairy at the base. *Frond* 4 inches to a span long, ovate or deltoid, bipinnate. *Pinnæ* crowded, imbricate, oblong-cuneate, inciso-pinnatifid; segments stout, broad, nerved, cut, the apices rather acute notched. *Involucres* very numerous, above the axils of the pinnules, cylindrical, with short lips. *Receptacles* long, rigid, protruded on the under side of the frond.

OBS. Mr. Colenso has sent young and barren specimens of a small, simple, oblong-fronded *Trichomanes* from caves, Manukau Bay, which I am not able to identify with any of the above.

Gen. VII. LOXSOMA, *Br.*

Sori marginales. *Involucrum* coriaceum, urceolatum; ore truncato, integro. *Capsulæ* clavatæ, receptaculo columnari exserto confertæ, breviter stipitatæ, pilis articulatis immixtæ, annulo obliquo completo cinctæ, longitudinaliter ruptæ.—Frons *valde coriacea, opaca, bi-tripinnatifida.* Pinnulæ *lanceolatæ, subacutæ, crenato-lobatæ.* Involucra *sinubus pinnularum inserta.* Rachis *et* stipes *glaberrima, nitida, sulcata.* Rhizoma *repens, crassum, dense crinitum.*

This genus contains but one species, a very remarkable and handsome Fern, confined to the northern parts of New Zealand.—*Rhizome* stout, woody, tortuous, clothed with long, curving, matted, red-brown hairs. *Stipes* erect; rachis (primary and partial) channelled, quite glabrous, polished, pale red-brown. *Frond* broadly triangular, 1–2 feet long, very coriaceous, glaucous below, tripinnate. *Pinnæ* rather distant, ascending, the lower opposite. *Pinnules* lanceolate, again pinnate or pinnatifid; segments linear-oblong, sub-acute, notched. *Involucres* prominent, inserted in the notches, pointing backwards from the frond, shortly urceolate or cup-shaped. *Receptacle* stout, twice as long as the involucre, covered with jointed hairs, amongst which are stalked capsules, that are surrounded by a complete oblique ring. *Spores* with a triangular mark. (Name from λοξος, *oblique*, and σωμα, *a body;* from the oblique capsules.)

1. Loxsoma *Cunninghamii, Br. MSS. A. Cunn. Prodr. Hook. Comp. Bot. Mag. v.* 2. *p.* 366. *t.* 31, 32. *Sp. Fil. v.* 1. *p.* 86. *Gen. Fil. t.* 15.

HAB. Northern Island, very scarce: Keri Keri River, Bay of Islands, *Cunningham, etc.* Wangarei River, *Sinclair.*

Tribe IV. POLYPODIEÆ.—*Sorus generally dorsal, punctiform, rounded or linear. Capsules not placed on an elevated receptacle, stalked, partly girt with a vertical ring, bursting transversely on the side where the ring is wanting.* Gen. VIII. to XXVIII.

Sub-tribe A.—*Sorus covered with an involucre (indusium), or with the more or less altered margin of the frond.* Gen. VIII. to XVIII.

Gen. VIII. DAVALLIA, *Sm.*

Sori subrotundi, marginales v. intra-marginales. *Involucrum* superficiarium, e apice venæ ortum, basi v. basi et lateribus frondis dorso adnatum, extus liberum. *Capsulæ* stipitatæ.

The only New Zealand species (*D. Novæ-Zelandiæ*) of this large tropical genus, has not hitherto been found elsewhere.—*Rhizome* creeping, woody, hispid. *Stipes* erect, deeply channelled in front, smooth above, very setose below, red-brown, shining. *Rachis* glabrous, polished, sometimes hairy at the axils. *Frond* ovate or ovate-oblong, 3 inches to 2 feet long, acuminate, tripinnate. *Pinnæ* stipitate, linear-oblong, acuminate; secondary pinnæ oblong-lanceolate, with deeply pinnatifid incised tips; ultimate (pinnules) ½ inch long, stipitate, ovate-lanceolate, pinnatifid; segments sharp. *Involucre* orbicular or broadly ovate, erose, attached by a broad base.—A very beautiful Fern, from the finely-cut frond, which is of a pale green colour. (Named in honour of *Edmund Davall*, a Swiss botanist.)

1. Davallia *Novæ-Zelandiæ*, Col.; fronde erecta ovata acuminata tripinnata, pinnis lineari-oblongis acuminatis, pinnulis stipitatis lanceolatis, ultimis stipitatis argute inciso-pinnatifidis, involucris late orbiculatis ovato-orbiculatisve basi lata adnatis erosis, rachi flexuosa polita, stipite superne glaberrima inferne rhizomateque setoso hispido.—*Col. in Tasm. Phil. Journ. Hook. Sp. Fil. v.* 1. *p.* 158. *t.* 51 *B.*

Hab. Northern Island: Bay of Islands, *Cunningham.* East Coast and interior, *Stephenson, Colenso.* Port Nicholson, *Lyall.*

Note. *Davallia Lindleyi*, Hook., is stated, but without sufficient authority, to be a New Zealand plant; it is also said to be found in Jamaica.

Gen. IX. LINDSÆA, *Dry.*

Sori lineares, marginales v. intra-marginales, continui v. interrupti. *Involucrum* exterius liberum, e membranis 2 parallelis, superiore textura frondis, inferiore ex apicibus venarum (unæ v. plurim.) oriente. *Venæ* simplices v. anastomosantes.—Frondes (speciebus Novæ-Zelandiæ) *parvulæ, coriaceæ, pinnatæ.*

A large genus of chiefly tropical Ferns, the New Zealand species of which are small, coriaceous, glabrous, and simply pinnate, with erect stipitate tufted fronds, rising from a creeping rhizome.—*Sori* linear, running along the edge of the pinnules continuously or interruptedly, covered by an involucre formed of two parallel lamellæ or plates opening outwards; of these the upper is coriaceous, and formed of the frond, the lower membranous and rises from the ends of one or more veins. (Name in honour of *Mr. John Lindsay*, author of 'Observations on the Germination of Ferns.')

1. Lindsæa *linearis*, Sw.; frondibus e rhizomate crasso subdistantibus linearibus pinnatis, pinnis sessilibus late cuneato-flabelliformibus, marginibus demum revolutis integris crenatisve, soris continuis, stipite rachique nitido.—*Sw. Fil. t.* 3. *f.* 3. *Br. Prodr. Kunze in Schk. Suppl. p.* 30. *t.* 16. *A. Rich. Flor. A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 206.

Hab. Northern and Middle Islands; not uncommon on dry hills, etc.

A very common extra-tropical Australian and Tasmanian Fern, easily recognized by its stout, creeping, scaly rhizome; erect, linear, simply pinnate fronds, 2–18 inches high; and broad-cuneate pinnules, which are spread out like a fan, and have entire or crenate anterior margins; the latter become revolute when dry.—*Pinnæ* ¼ inch broad, distant; *sori* nearly continuous along their outer edge. *Stipes* and *rachis* stout, purplish-brown, shining.

2. Lindsæa *trichomanoides*, Dryand.; rhizomate repente paleaceo, frondibus subcæspitosis late lanceolatis pinnatis bipinnatisve, pinnis primariis basi cuneatis stipitatisve oblongo-lanceolatis lineari-lanceolatisve pinnatifidis pinnatisve lobatis rarius integris, pinnulis obovato-cuneatis breviter stipitatis decurrentibusve, margine anteriore rotundato simplici v. lobato, soris continuis.

α. Fronde bi-tripinnata. L. trichomanoides, *Dryander in Linn. Soc. Trans. v.* 3. *p.* 43. *t.* 11. *Schk. Fil. t.* 114. *A. Rich. Flor. A. Cunn. Prodr. Hook. Sp. Fil. v.* 1. *p.* 218. L. viridis, *Colenso in Tasm. Phil. Journ.* Adiantum cuneatum, *Forst. Prodr.*

β. Lessoni; fronde pinnata v. basi bipinnata, pinnis oblongo-lanceolatis obtusis integris lobatis pinna-

tifidisve, segmentis ut in *a*. L. Lessoni, *Bory in Duperrey Voy. p.* 278. *t.* 37. *f.* 2. *A. Rich. Flor. A. Cunn. Prodr. Hook. l. c.*

Hab. Throughout the Islands, common.

An extremely variable little Fern, which has very lately been found in the humid forests of Western Tasmania by Mr. Gunn.—*Rhizome* creeping, scaly, and having pilose roots. *Fronds* pinnate or bi-tri-pinnate, numerous, ovate or linear-oblong, rather tufted, erect, 2 inches to 2 feet high. *Stipes* scaly at the base, and rachis slender, stiff, trigonous, polished. *Pinnæ* rather distant, sometimes in var. *Lessoni* simple, oblong-lanceolate, with a cuneate base, blunt, lobed, bearing sori on the lobes; more often pinnatifid, with cuneate lobes; very frequently bi- and even tripinnate. *Pinnules* always broadly cuneate, rounded in front, with a deep continuous intra-marginal sorus.—I consider *L. Lessoni* and *trichomanoides* to be certainly varieties of the same plant. The pinnules vary from $\frac{1}{4}$–$\frac{3}{4}$ inch long; the larger are lobed, and bear a sorus on each lobe.

Gen. X. ADIANTUM, *L.*

Sori marginales, punctiformes v. elongati. *Involucrum* soris conforme, e margine frondis reflexo, disco venoso capsulifero, limbo membranaceo libero.

Beautiful terrestrial Ferns, natives chiefly of the Tropics, but of which one species, called "Venus' Hair," is found in Europe, and several occur in Australia, Tasmania, and New Zealand.—*Rhizome* creeping. *Stipes* generally black, often polished. *Fronds* bi-tripinnate in the New Zealand species, with stipitate, broadly cuneate pinnules. *Sori* marginal, short, or linear and continuous. *Involucre* formed of the reflexed, often kidney-shaped edge of the frond, opening inwards, its surface veined; the veins continuous with those of the pinnules. (Name from αδιαντος, in allusion to the *dry* texture of the fronds.)

1. Adiantum *hispidulum*, Sw.; fronde rigida subflabellatim ramosa bipartita bi-tripinnata, pinnis (secundariis) linearibus acuminatis sæpe falcatis, pinnulis plurimis stipitatis approximatis dimidiato-oblongis obtusis basi cuneatis olivaceis subtus striatis hispidulis glabratisve spinuloso-serrulatis, soris plurimis parvis confertis sinubus insertis, involucris orbiculatis brunneis, rachibus brunneis hispido-setosis, stipite scaberulo nitido.—*Sw. Syn. Fil. Br. Prodr. A. Rich. Flor. A. Cunn. Prodr. Hook. Sp. Fil. v.* 2. *p.* 31. A. pubescens, *Schk. t.* 116. *A. Rich. l. c. Endl. Prod. Fl. Ins. Norf.* A. pedatum, *Forst. Prodr., non Linn.*

Hab. Northern Island, from the Bay of Islands to Cook's Straits. (Cultivated in England.)

A widely diffused native of the Tropics and south temperate regions of the Old World, Australia, the Society Islands, Java, the East Indies, and Mauritius.—*Stipes* dark brown, shining, rough, 3 inches to a span long. *Frond* broad, bi-tripinnate, 6–12 inches long, often dividing at once into two branches, whence the pinnæ spring; they are ascending, curved, and spread out like a fan; the mode of branching is however irregular. *Primary pinnæ* linear, with many stipitate pinnules. *Pinnules* coriaceous, olive-green, striated, hispid, $\frac{1}{3}$–$\frac{1}{2}$ inch long, obliquely oblong, blunt, cuneate at the base, upper margin covered with the numerous red-brown sori, each orbicular, situated on a narrow sinus of the pinnule.

2. Adiantum *affine*, Willd.; fronde glaberrima tenera flaccida pinnata bipinnata v. rarius tripinnata, pinnis paucis lineari-lanceolatis laxis, pinnulis membranaceis olivaceis late dimidiato-oblongis falcatis apice truncato-rotundatis crenatis superne setulis raris instructis, margine superiore crenato, sinubus soriferis, involucris remotis pallidis reniformibus lunatisve, rachi stipiteque gracili ebeneo lævi.—*Willd. Sp. Pl. Endl. Prodr. Fl. Ins. Norf. A. Rich. Flor. A. Cunn. Prodr. Hook. Sp. Fil. v.* 2. *p.* 32. A. trapeziforme, *Forst. Prodr. Schk. Fil. t.* 121, *non Linn.* A. setulosum, *J. Sm. in Comp. Bot. Mag.* 1846. *p.* 22.

Hab. Northern and Middle Islands, *Forster, etc.* Akaroa, *Raoul.* (Cultivated in England.)

Norfolk Island is the only other known habitat for this species, which may be recognized by its slender, glossy, smooth, black stipes and rachis, sparingly branched, flaccid frond, linear pinnæ, and broadly oblong, curved, very blunt pinnules, $\frac{1}{2}$–$\frac{3}{4}$ inch long, which are membranous, dark green, and have a few scattered black hairs on the upper surface. The *involucres* are few, scattered, each placed in a sinus of the crenate pinnules, pale, kidney-shaped. I have seen specimens with simply pinnate fronds.

3. Adiantum *Æthiopicum,* Linn.; fronde tenera flaccida oblongo-ovata tri-quadripinnata, pinnulis membranaceis glaberrimis stipitatis orbiculatis basi late cuneatis margine superiore lobato, soris 2–6 sinubus pinnulæ, involucris majusculis oblongo-lunulatis reniformibusve, stipite rachique gracili glaberrima nitida rufa v. ebenea.—*Linn. Sp. Pl. Hook. Sp. Fil. v.* 2. *p.* 37. *t.* 77 *A.* A. assimile, *Sw. Syn. Fil. Br. Prodr. Hook. l. c.* A. trigonum, *Lab. Fl. Nov. Holl. v.* 2. *p.* 99. *t.* 248. *f.* 2.

Hab. Northern Island: from the Bay of Islands to Cook's Straits; in open ground. East Coast, *Colenso.* Auckland, *Sinclair.* Houraki Gulf, *Lyall.* (Cultivated in England.)

A. assimile was regarded as a distinct species from *A. Æthiopicum,* till the author of the 'Species Filicum' pointed out its identity with that plant. It is found in all tropical countries, and throughout the south temperate hemisphere, but is hardly known in the north temperate; it inhabits Australia and Tasmania.—Everywhere perfectly glabrous, flaccid, membranous, pale green or yellowish. *Stipites* tufted, slender, 4–10 inches long. *Frond* oblong, often elongated, tri-quadripinnate; *primary branches* alternate, distant. *Pinnules* $\frac{1}{4}$–$\frac{1}{3}$ inch broad, broadly cuneate, stipitate; upper margin rounded, deeply lobed. *Sori* few. *Involucres* very large, pale, kidney-shaped, placed in notches of the pinnules. *Rachis* slender, flexuose; partial ones and stalks of the pinnules capillary.

4. Adiantum *formosum,* Br.; erectum, fronde ampla deltoidea quadripinnata v. supradecomposita, pinnis primariis subremotis ovato-lanceolatis, pinnulis (pro planta parvis) rigidis oblique rhombeo-oblongis stipitatis basi cuneatis obtusis margine superiore et anteriore inciso-crenatis dentatisque lobis retusis soriferis, involucris transverse elongatis, rachi flexuosa supra strigoso-pubescente subtus glaberrima nitida, stipite valido scabro nitido ebeneo.—*Br. Prodr., non A. Cunn. Prodr. Hook. Sp. Fil. v.* 2. *p.* 51. *t.* 86 *B.*

Hab. Northern Island: alluvial banks of the Manganaitoka River, *Colenso.*

A very rare plant, except about Port Jackson; the tallest New Zealand species.—*Fronds* 2–4 feet high, very much branched, stiff or flaccid. *Pinnules* stipitate, obliquely oblong; lower margin straight or slightly arched; inner straight; upper convex; outer blunt, toothed and crenate; lobules or teeth bearing small, transversely elongated, shallow involucres. *Rachis* general and partial, glabrous and shining below, covered with short stiff hairs above. *Stipes* very black, shining, rough.

5. Adiantum *Cunninghamii,* Hook.; fronde subdeltoidea bi-tripinnata, pinnis paucis lineari-oblongis, pinnulis stipitatis subchartaceis glaberrimis subtus glaucis late oblique oblongis obtusis margine superiore et exteriore crenato-lobatis, lobis retusis soriferis, soris plurimis parvulis, involucris reniformibus orbiculari-reniformibusve sinu angusto, stipite basi scaberulo v. rachique glaberrima nitida ebenea.—*Hook. Sp. Fil. v.* 2. *p.* 52. *t.* 86 *A.* A. formosum, *A. Rich. Flor. A. Cunn. Prodr., non Br.*

Hab. Northern Island: from the Bay of Islands to Cook's Straits, *D'Urville, Cunningham, etc.*

A species only known to inhabit New Zealand.—*Fronds* 6–18 inches tall, sparingly and irregularly branched, bipinnate, rarely (in small specimens) simply pinnate. *Pinnules* $\frac{1}{2}$ inch long, like those of *A. formosum,* but with larger rounded reniform involucres; it further differs from that plant in the rachis being perfectly glabrous on both surfaces, as is the stipes, except sometimes at the very base.—Small specimens resemble *A. affine,* but are less membranous, have no black hairs on the pinnules, and the stipes is stouter. Some slender specimens, apparently much drawn out, from growing in woods, have long pedicels to the pinnules, which are linear-oblong, deeply and variously lobed. The sinus of the involucre is always very narrow and deep.

6. Adiantum *fulvum,* Raoul; fronde deltoidea bi-tripinnata, pinnis linearibus lineari-oblongisve, pinnulis breve stipitatis cultratis lineari-oblongis chartaceis superne pilosis pilis atris sparsis v. glaberrimis, margine superiore et exteriore obtuso crenato-dentato, involucris majusculis sinubus pinnulæ sitis rotundato-reniformibus sinu angusto profundo, rachi supra pilis fulvis substrigosa, stipite ebenea basi scabra superne sublævi.—*Raoul, Choix de Plantes, p.* 9. *Hook. Sp. Fil. v.* 2. *p.* 52. *t.* 85 *A.*

HAB. Northern and Middle Islands; from the Bay of Islands to Banks' Peninsula, *Raoul, Colenso, Sinclair, etc.*

I have gathered many specimens of *Adiantum* that fall under the above description, but consider the species a very doubtful one; its habit, general appearance, and structure of the involucre so closely resemble *A. Cunninghamii,* that the two plants may easily be mistaken. This differs from *A. Cunninghamii* in the strigose pubescence of the rachis, in the less glaucous, coarser, sometimes hairy pinnules, which are usually more oblong and lobed. Other specimens, with subpedate fronds and hairy pinnules, resemble *A. hispidulum,* but the involucres are smaller and plant less hispid; others resemble *A. affine* still more closely, and are to be distinguished by the less membranous pinnules and smaller involucres.

Gen. XI. HYPOLEPIS, *Bernh.*

Sori punctiformes, marginales, distincti. *Involucrum* apice e venula ortum, lobulæ frondis recurvi formatum, coriaceum v. submembranaceum.

It is difficult to distinguish this genus by technical characters of the fructification from *Adiantum,* from which it is widely different in habit and general appearance. The sori are small, placed on the margins of the pinnules, in a sinus, and are covered with a small reflexed lobe, which is never so membranous as in *Adiantum,* but is green and herbaceous. *Sometimes* the reflexion of the pinnule's margin is so slight that the sorus is really naked, and then I cannot distinguish the genus from *Polypodium,* or the species *H. tenuifolia* from *P. rugulosum,* Lab. (Name from ὑπο, *beneath,* and λεπις, *a scale.*)

1. Hypolepis *tenuifolia,* Bernh.; fronde ampla glanduloso-pilosa v. glabrata submembranacea quadripinnata, pinnis primariis ovatis v. ovato-oblongis acuminatis, secundariis tertiariisque lanceolatis, pinnulis sessilibus lineari-oblongis obtusis lobatis pinnatifidis inferioribus soriferis, lobis oblongis obtusis crenato-dentatis subintegerrimisve basin versus soriferis, involucro reniformi, costa rachibusque glanduloso-pilosis, stipite brunneo puberulo et scaberulo, rhizomate valido longe repente squamoso.—*Bernhardi in Schrad. Journ. Presl, Tent. Pterid. t.* 6. *f.* 29. *Hook. Sp. Fil. v.* 2. *p.* 60. *t.* 19 *A.* Cheilanthes arborescens, *Swartz.* C. pellucida, *Colenso, Tasm. Phil. Journ.* C. ambigua, *A. Rich. Flor. A. Cunn. Prodr.* Lonchites tenuifolia, *Forst. Prodr.* C. Dicksonioides, *Endl. Prodr. Flor. Ins. Norf. Kunze, Farnk. p.* 13. *t.* 8.

HAB. Northern Island, *Colenso, Sinclair, etc.* (Cultivated in England.)

A tall, handsome, spreading Fern, 2–5 feet high, found in Australia, Tasmania, the Pacific and Philippine Islands, the West Indies, and, if the same with *Polypodium rugulosum,* as I very much suspect, it is found in all warm and many temperate parts of the globe. New Zealand specimens vary a good deal in the colour, hairiness, and membranous or coriaceous consistence of the fronds, as they grow in more shaded or open localities.—*Frond* sometimes 2 feet broad, deltoid, tri-quadripinnate; primary pinnæ or branches spreading; secondary and tertiary narrow, oblong, acuminate; ultimate, or *pinnules,* sessile, linear-oblong, 1½–2 inches long, deeply pinnatifid. *Lobes* linear-oblong, blunt, bluntly crenate. *Sori* generally two or three on each side of the lobe, covered by an involucre formed of a portion of the recurved margin of each crenature. *Costa* hairy; rachis yellow-brown, glandular and hairy. *Stipes* stout, often viscid, glandular, hairy and rough.—There is a New Zealand variety of this species with nearly glabrous rachis and stipes, more distant and acuminate secondary and tertiary pinnæ, narrower pinnules,

which are deeper lobed, and bear more numerous sori, scarcely covered by the involucre, and which hence passes into *Polypodium rugulosum*, Lab. Forster, probably through accident, calls this an arborescent Fern.

2. Hypolepis *Millefolium*, Hook.; fronde spithamæa submembranacea ovata v. deltoidea tripinnata, pinnis primariis lineari- v. ovato-lanceolatis, secundariis lineari-oblongis obtusis, tertiariis (pinnulis) stipitatis lato-oblongis obtusis profunde pinnatifidis glabratis, segmentis late oblongis inciso-lobulatis margine superiore soriferis, soris parvulis, costis rachi stipiteque sparse subglanduloso-pilosis, rhizomate repente nudo. —*Hook. Sp. Fil. v.* 2. *p.* 68. *t.* 95 *B.*

Hab. Northern and Middle Islands: shady places near the top of the Ruahine mountains, *Colenso.* Lake Rotiuti, Nelson, *Monro.*

A very much smaller, more delicate, and more finely cut species than *C. tenuifolia.*—*Fronds* a span to a foot high, broadly deltoid or ovate, tripinnate. *Primary pinnæ* few, ovate or linear-lanceolate; *secondary* $\frac{3}{4}$ inch long, shortly stalked, linear-oblong, blunt; *tertiary* broadly ovate or oblong, blunt, also stalked, pinnatifid, or cut on each side into three or four lobes, which again are inciso-crenate. *Sori* solitary on the lobes of the pinnules, small, covered with the reflected edge of a crenature. *Stipes* and *rachis* and *costa* all pale, covered with weak scattered hairs. *Stipes* sometimes hairy at the base. *Rhizome* without scales, creeping.

3. Hypolepis *distans*, Hook.; gracilis, spithamæa ad bipedalem, rigida, fronde coriacea (sicca brunnea) lineari-ovata acuminata bipinnata, pinnis primariis distantibus anguste lineari-lanceolatis, secundariis breviter stipitatis lineari-oblongis obtusis crenato-lobatis glaberrimis, soris parvulis lobulis reflexis pinnularum involucratis, rachibus stipiteque rigidis aculeolatis scaberulis, rhizomate squamoso villoso.—*Hook. Sp. Fil. v.* 2. *p.* 70. *t.* 95 *C.*

Hab. Northern Island: Northern extreme, *Edgerley.* Hokianga, Hutt Valley, and Tararua, *Colenso.*

A remarkably distinct-looking plant, rigid, wiry, and sparingly branched, of a brown colour when dry.—*Rhizome* creeping, with scaly brown hairs, very woolly, as are the rootlets. *Stipes* short or long, dark red-brown, rigid, and, as well as the rachis and often costa, rough with minute prickles. *Frond* a span to $1\frac{1}{2}$ foot long, bipinnate. *Pinnæ* distant, opposite, slender. *Pinnules* numerous, rather distant, linear-oblong, blunt, very shortly stipitate, $\frac{1}{4}$ inch long, rigid, coriaceous, glabrous, crenate, lobed or almost pinnatifid. *Sori* very small, each covered by an involucre formed of a recurved crenature or lobule of the pinnule.

Gen. XII. CHEILANTHES, *Sw.*

Sori punctiformes, marginales, distincti. *Involucra* ut in *Hypolepide*, sed plerumque confluentia.

Though the New Zealand species of *Cheilanthes* does not at all resemble *Hypolepis*, it is not readily characterized, except by having confluent involucres; *i. e.* instead of solitary isolated teeth or lobes of the pinnules being reflexed over the sori, longer portions of the margin of the frond are so, to a greater or less degree, forming a continuous involucre. The genus is a very large and widely diffused one, and the only New Zealand species closely resembles *Notholæna distans.* (Name from χειλος, *a lip*, and ανθος, *a flower;* from the form of the indusium.)

1. Cheilanthes *tenuifolia*, Sw.; rhizomate crasso repente squamoso, frondibus cæspitosis erectis glaberrimis coriaceis lineari-ovatis deltoideisve tripinnatis contractis e pinnis primariis erectis distantibus, pinnulis parvis sparsis lineari-oblongis ovatisve lobatis pinnatifidisve, lobulis obtusis obtuse crenatis omnibus soriferis, soris continuis, stipite rachibusque validis brunneis nitidis glaberrimis v. stipite basi piloso.—*Swartz, Syn. Fil. Schkuhr, t.* 125. *Br. Prodr. A. Rich. Flor. A. Cunn. Prodr. Hook. Sp. Fil. v.* 2. *p.* 82. C. Sieberi, *Kunze, Hook. l. c. t.* 97 *B.* C. Preissiana, *Kunze in Plant. Preiss. Hook. l. c.* Pteris humilis, *Forst. Prodr. ?*

Hab. Northern and Middle Islands; as far south as Banks' Peninsula, in dry places, *Banks and Solander, etc.*

The true *C. tenuifolia* is a very widely diffused Fern, throughout the warmest parts of Asia, in Australia, Tasmania, and the Malay Archipelago. The Australian and New Zealand plants are smaller, and have often a more contracted frond than the Indian, and have hence been made into another species (*C. Sieberi*). The immense suite of specimens preserved in the Hookerian Herbarium, however, shows that all are one and the same plant, to which the *C. Preissiana* of Kunze (who quotes Lesson's New Zealand specimens as identical with the Swan River ones, which he describes, and which I have examined) must be added. The latter has been distinguished by the presence of a few hairs towards the base of the stipes, a character I find present and absent in different fronds of the same specimen. I have quoted the figure of *C. Sieberi* (in Hook. Sp. Fil.) as exactly resembling the New Zealand plant, and not that of *C. tenuifolia*, which is taken from the Indian form of the species.—*Rhizome* very stout, thickly covered with silky long scales. *Stipes* tufted, stout, glossy, red-brown, quite glabrous, or with a few spreading hairs towards the base. *Fronds* 3 inches to a span or a foot long, narrow-ovate or oblong, rarely deltoid, much contracted from the erect pinnæ, tripinnate. *Pinnæ* distant; secondary scattered. *Pinnules* perfectly glabrous, few and small, coriaceous, 3–5 lines long, yellow-green, linear-oblong, blunt, crenate; their margins very revolute, lobed or pinnatifid; margins of all the lobes reflexed, forming a continuous coriaceous crenate involucre, with membranous edges. *Capsules* very numerous and prominent, often covering the pinnules. *Rachis* red-brown, shining, quite smooth.—This is anything but a handsome Fern in colour, form, or texture, always looking starved and dry; the small, narrow, scattered pinnules, with revolute margins, bearing a small proportion in size to the stout stipes and rachis. The pinnules often appear as a mass of fructification. In some specimens the primary pinnæ are reduced to small crumpled lobes not ½ an inch long.

Gen. XIII. PTERIS, *Br.*

Sori lineares, marginales, continui; capsulis sinu involucri insertis. *Involucrum* marginale, continuum, scariosum, intus liberum.—*Br. Prodr.*

One of the largest and most extensively distributed groups of Ferns, which has been divided (on so many and various grounds) into so many genera, that, were they adopted here, one might perhaps be found for each New Zealand species. Such dismemberments of genera, though extremely useful to the skilled botanist when working upon a multitude of species from all parts of the world, are, when not absolutely necessary, highly inconvenient for local floras, rendering these impracticable to the student. I have therefore, in this case, adopted the old genus, as defined in Brown's 'Prodromus Floræ Australis,' and introduced as sections those of the new that are natural. *Pteris*, thus characterized, contains all those Ferns whose sori run continuously, or nearly so, along the edge of the whole pinnule, and are covered with a continuous scarious or membranous involucre, formed of the incurved edge of the frond. It is distinguished from *Cheilanthes* only by the greater continuity and regular outline of the involucre. (Name from πτερυξ, *a plume.*)

§ 1. Platyloma, J. Sm.—*Frond pinnate* (*in the New Zealand species*); *veins forked, free.*

1. Pteris (Platyloma) *falcata*, Br.; frondibus rigidis erectis linearibus pinnatis, pinnis lineari-oblongis lanceolatisve acutis mucronatisve falcatis glabris basi obliquis obtusis nunc margine superiore basi auriculato, stipite rachique squamato.—*Br. Prodr.* P. seticaulis, *Hook. Ic. Plant. t.* 207.

Hab. Northern Island: Auckland, *Sinclair*. (Cultivated at Kew.)

A native of the Peninsula of India, Australia, and Tasmania.—*Fronds* erect, coriaceous, rigid, tufted, 1–3 feet high, narrow linear, pinnate. *Pinnæ* quite glabrous, linear-lanceolate or oblong, ⅔–1⅓ inch long (in Australian specimens 2½ inches), shortly stipitate, falcate, acute or mucronate, oblique at the base, which is very broadly cuneate; the upper margin sometimes produced into a lobe or gibbous. *Sori* broad, continuous all round the pinnule, partially covered with a very narrow involucre. *Rachis* stout, densely villous, and covered with spreading scaly hairs. *Stipes* black, hispid.

2. Pteris (Platyloma) *rotundifolia*, Forst.; frondibus rigidis decumbentibus v. suberectis linearibus

pinnatis, pinnis late oblongis rotundatisve obtusis mucronatisve glabris basi oblique truncatis, stipite rachique hispido-paleaceis.—*Forst. Prodr. A. Rich. Flor. A. Cunn. Prodr.*

HAB. Northern and Middle Islands: as far south as Banks' Peninsula, *Forster, etc.* (Cultivated at Kew.)

Very variable in size, and so much so in length of pinna, that I quite believe that it will prove a variety of *P. falcata*, from which it only differs in the narrower, generally decumbent frond, much broader and shorter pinnæ, which are broadly oblong and blunt, or rounded, and in the sori being often interrupted. Some of Dr. Sinclair's specimens seem quite intermediate, as are others cultivated at Kew.

§ 2. PTERIS, L.—*Fronds bi-tripinnate. Veins forked, free, united at their ends by the continuous receptacle.*

3. Pteris *aquilina*, L., var. *esculenta;* fronde rigida coriacea tripinnata glabra v. subtus parce pubescente v. pilosa, pinnulis anguste linearibus ultimis sæpius longe caudatis decurrenti-coadunatis, costa crassa, rachibus stipiteque validis glabris. P. esculenta, *Forst. Prodr. Swartz, Syn. Fil. Lab. Fl. Nov. Holl. v. 2. p. 95. t. 244. Br. Prodr. Endl. Prodr. Fl. Ins. Norf. A. Rich. Flor. A. Cunn. Prodr.*

HAB. Throughout the Islands, as far south as Akaroa. Nat. name, "Aruhe," and "Roi" for the root, *Col.*

One of the most common New Zealand Ferns, and in many places a great pest to agriculturists, who find its running woody roots very difficult to extirpate. The latter roasted were formerly a staple article of food with the natives. The same variety grows in Australia, Tasmania, and the Pacific Islands, and differs very slightly from the *P. aquilina* of the north temperate zone, which has fully twenty names in systematic works, and is found in one form or another in all parts of the world.—*Rhizome* subterranean, creeping, as thick as two fingers. *Stipes* sometimes 10 feet high, grooved on one side, stout, pale yellow, shining, glabrous. *Frond* 2–4 feet long, broadly deltoid, tri-quadri-pinnate, of a very hard rigid coriaceous texture, glossy above. *Pinnules* linear, decurrent and united with one another, by forming a wing to the rachis, often hairy below. *Sori* continuous, frequently surrounding the pinnules, and even continued along their decurrent bases, to those of the pinnule below them. *Involucres* very coriaceous. *Midrib* very thick, often grooved and hairy.—Cunningham has made some mistake about this plant in his 'Prodromus,' implying he never saw it, and doubting its being a native, whereas it is the most common of all Ferns at the Bay of Islands, whence there are fine specimens in his own Herbarium, but unnamed.

4. Pteris *tremula*, Br.; fronde elata glaberrima submembranacea bi-quadripinnata, pinnis primariis ascendentibus, pinnulis linearibus adnatis decurrentibus subacutis sterilibus rarius integerrimis crenato-dentatis fertilibus plerumque integris, venis furcatis omnibus liberis, rachi stipiteque glaberrimis.—*Br. Prodr.* P. affinis, *A. Rich. Flor. A. Cunn. Prodr.* P. tenuis, *A. Cunn. Prodr.*

HAB. Throughout the Northern Islands; abundant. (Cultivated at Kew.)

This is a very common Tasmanian, Norfolk Island, and Australian plant, also found in Juan Fernandez and Chili, and which so closely resembles *P. arguta* of the South of Europe, the Atlantic Islands, Abyssinia, Africa, and the East Indies, that I think it possible that all may be proved to belong to one widely diffused species.—Extremely variable in size, from 1–5 feet, in consistency from membranous to coriaceous, in colour from pale light green to olive-green, in amount of the division from bi- to quadri-pinnate, or almost decompound, and in breadth and length of the pinnules, which are quite entire or crenate. Its general characters are those of a perfectly glabrous tripinnate frond, rather membranous, broadly deltoid, with ascending branches; the pinnules 1–2 inches long and ¼ broad, linear, blunt, adnate, decurrent, crenate, with forked free veins, and a glabrous shining costa and rachis: specimens in which all the pinnules are soriferous have these much narrower, more coriaceous, with the involucres sometimes reaching to the costa; this has given rise to A. Cunningham's *P. tenuis.*

5. Pteris *scaberula*, A. Rich.; rigida, erecta, glanduloso-pubescens, fronde erecta coriacea ovato-lanceolata v. lineari-oblonga et contracta bi-tripinnata, pinnis secundariis lineari-lanceolatis stipitatis pro-

funde pinnatifidis pinnatisve v. dissectis, segmentis glaberrimis glanduloso-puberulisve ultimis minimis obovato-oblongis basi angustatis substipitatis crenato-serratis rarius elliptico-oblongis integerrimis rachibus et stipite glanduloso-pubescentibus scaberulisque.—*A. Rich. Flor. p.* 82. *t.* 11. *A. Cunn. Prodr. Hook. Sp. Fil. t.* 93 *A.* P. microphylla, *A. Cunn. Prodr.*

HAB. Northern and Middle Islands: frequent as far south as Akaroa.

A very distinct and pretty species, easily recognized by its much-divided frond and minute coriaceous pinnules: it is found in New Zealand only.—*Rhizome* stout, woody, creeping, hairy and often scaly. *Stipes* very stout, erect, often a span or more long, glandular and covered with red-brown hairs. *Frond* a span to a foot long, broadly ovate or elongated and contracted, tripinnate; ultimate segments 1 line to ¼ inch long, very coriaceous, pale yellow-green, quite glabrous or glandular-pubescent, entire or toothed, generally obovate, stalked, blunt, sometimes elliptic-oblong, acute, and entire, and then auricled at the base. *Sori* generally surrounding the whole pinnule. *Rachis* stout, flexuose, yellow-red, hairy and glandular.

§ 3. LITOBROCHIA.—*Veins more or less anastomosing.*

6. Pteris (Litobrochia) *Vespertilionis,* Lab.; fronde glaberrima elata ampla bi-tripinnata subtus glaucescente membranacea, pinnis primariis ovato-lanceolatis, secundariis lineari-lanceolatis acutis sæpius sessilibus rachive adnatis, pinnulis late oblongis oblongo-lanceolatisve rarius lanceolatis obtusis integerrimis v. obtuse lobatis crenatis pinnatifidisve, venulis furcatis basi plerumque anastomosantibus, costa flexuosa, rachi stipiteque glaberrimis pallidis nitidis antice sulcatis.—*Lab. Flor. Nov. Holl. v.* 2. *p.* 96. *t.* 245. *Br. Prodr. Flor. Antarct. p.* 110. P. Brunoniana, *Endl. Prodr. Fl. Nov. Holl. A. Cunn. Prodr.* P. montana, *Col. in Tasm. Phil. Journ.*

HAB. Throughout the Islands; not uncommon on the margins of woods, etc. (Cultivated at Kew.)

An Auckland Island, Tasmanian, Norfolk Island, and New Holland plant; also found in the East Indian Islands, at the Mauritius, South Africa, and Tristan d'Acunha, in Brazil, Juan Fernandez, and the West Indies.—*Fronds* perfectly glabrous, tall (2–4 feet), ample, broadly deltoid, membranous, glaucous below, bi-tripinnate; small specimens are sometimes simply pinnate. *Primary pinnæ* ovate-lanceolate; *secondary* linear, sometimes pinnatifid; *pinnules* broadly oblong or rounded, quite entire, adnate and decurrent, rarely linear; *costa* flexuose; *veins* forked, often joining at the base in the lower pinnules. *Stipes* and *rachis* very pale yellowish or brown, channelled in front, shining, often glaucous.

7. Pteris (Litobrochia) *macilenta,* A. Rich.; fronde tenuiter membranacea flaccida glaberrima v. inferne sparse puberula elata ampla bi-quadripinnata, pinnis primariis secundariisque longe stipitatis remotis sparsis, pinnulis paucis remotis inferioribus stipitatis superioribus adnatis decurrentibus pinnatifidis basi pinnatis, segmentis ovato-oblongis acutis argute grosse inciso-serratis lobatisve, costa flexuosa, venis rarius furcatis nunc basi anastomosantibus, soris sinubus latis continuis, stipite rachique pallidis gracilibus.—*A. Rich. Flor. p.* 82. *t.* 12. *A. Cunn. Prodr.*

HAB. Throughout the Northern Island, in dark groves, *D'Urville, etc.*

One of the most beautiful New Zealand Ferns, found nowhere else, extremely variable in size, from 1 to nearly 5 feet high.—*Frond* broadly deltoid, bi-quadri-pinnate, very delicate, membranous and flaccid, with the pinnæ scattered along the slender rachis, quite glabrous, or with a few white, soft, short, scattered hairs below. *Pinnules* 1–4 inches long, lower stalked, upper adnate, pinnatifid; the lobes oblong, sharp, sharply coarsely toothed towards the tip, or lobed. *Sori* continuous in the hollows, but not extending to the tips of the segments. *Stipes* and *rachis* very slender, pale, shining, quite glabrous or sparingly pubescent.

8. Pteris (Litobrochia) *comans,* Forst.; fronde ampla membranacea flaccida bi-tripinnata glaberrima v.

subtus sparse puberula, pinnis primariis ovato-lanceolatis acuminatis, secundariis lanceolatis lineari-lanceolatis pinnatifidis rarius caudatis, segmentis oblongis subacutis crenato-dentatis pinnatisve, pinnulis sessilibus stipitatisve plerumque basi adnata decurrentibus lineari-oblongis linearibusve serratis lobatis pinnatifidisve, lobis serratis, venis furcatis anastomosantibus, rachibus stipiteque glabris.—*Forst. Prodr. Endl. Prodr. Flor. Ins. Norf. A. Rich. Flor. A. Cunn. Prodr. Schkuhr, Fil. t.* 92. P. Endlicheriana, *Agardh, Recens. Gen. Pterid. p.* 66. *Hook. Ic. Plant. t.* 973.

HAB. Northern Island: Bay of Islands, etc., *D'Urville.* Falls of Keri Keri River, *Cunningham, etc.* Auckland, Waikate, and Great Barrier Island, *Sinclair.*

A very similar plant to *P. tremula*, but with broader fronds and pinnules, which are very variable in size: it is best known from that plant by the veins being always connected by branches near the costa. It is a native of Norfolk Island, Tasmania, and Juan Fernandez, whence the specimens are almost quadripinnate, with the primary pinnæ often caudate, and the pinnules narrower. In some New Zealand specimens the frond appears pinnate or bipinnate at most, the pinnæ pinnatifid, with very broad segments, 1½ inch long and nearly ½ inch broad, acute and serrated at the tips only; in these the veins branch and anastomose repeatedly. This appears from specimens in the British Museum to be certainly the *P. comans* of Forster, long considered a doubtful plant, and the *P. Endlicheriana*, Ag.

Gen. XIV. LOMARIA, *Willd.*

Sori frondibus distinctis, lineares, continui; capsulis demum superficiem totam pinnulæ contractæ operientibus. *Involucrum* marginale, scariosum, continuum, intus liberum v. dehiscens.

A large tropical and south temperate genus of Ferns.—*Fronds* tufted, usually pinnatifid, or simply pinnate; the central ones in the tufts bearing fructification, the rest barren, with broader pinnæ; sometimes one side only, or a few pinnæ of the frond only are fertile. *Sori* as in *Pteris*, but generally occupying the whole under surface of the pinnule, as in *Stenochlæna*, which however has no true involucre. *Involucre* marginal, scarious, continuous, often reaching the costa. (Name from λωμα, *a fringe*; in allusion to the scarious indusium.)

§ a. *Sterile fronds pinnate. All, or at least the lowest pinnæ contracted at the base, or stipitate.*

1. Lomaria *procera*, Spr.; elata, rigida, valde coriacea, frondibus pinnatis, pinnis sterilibus lineari-oblongis v. ensiformi-lanceolatis v. acutis acuminatis caudatisve basi truncatis angustatis auriculato-cordatisve, fertilibus (ejusdem v. diversæ frondis) linearibus, costa subtus stipite rachique paleacea v. nuda.—*Spreng. Syst. Veg. A. Cunn. Prodr. Hook. Ic. Plant. t.* 407, 408. *Fl. Antarct. p.* 110. L. latifolia, *Col. in Tasm. Phil. Journ.* Stegania procera, *Br. Prodr. A. Rich. Flor. p.* 86. *t.* 13. Blechnum procerum, *Lab. Fl. Nov. Holl. v.* 2. *p.* 87. *t.* 247. Parablechnum procerum, *Presl, Epimel. p.* 109.

Var. *α*; elata, robusta, valde coriacea, pinnis sterilibus basi oblique truncatis v. late cuneatis.

Var. *β*; omnia var. *α*, sed pinnis sterilibus basi auriculato-cordatis.

Var. *γ*; omnia var. *α* et *β*, sed pinnis sterilibus basi angustatis.

Var. δ. *minor*; pallide viridis, minus coriacea, pinnis sterilibus subobtusis basi subtransversa, superioribus adnatis. Stegania minor, *Br. Prodr.* (TAB. LXXV.)

HAB. Abundant throughout the Islands, in woods and marshes, on rocks, etc. (Cultivated at Kew.)

A common and extremely variable Fern, of a very coarse texture, found in Auckland Island, Australia, and Tasmania, and which I cannot distinguish specifically from the West Indian *L. lineata*, the South American *L. Chilensis*, and the South African *L. Capensis.* It differs from the Antarctic American *L. Magellanica* in the broader and shorter paleæ at the base of the stipes.—*Fronds* a span to 4 feet high, tufted, growing from a stout caudex, that often becomes woody and frutescent. *Stipes* very stout, generally paleaceous at the base. *Rachis* generally naked and glabrous. *Sterile fronds* pinnate, short and broadly ovate or lanceolate. *Pinnæ* three to twenty pair, distant, or

approximate and imbricating at the base: the upper generally adnate, lower stalked, extremely variable in length, from 2–12 inches long and from ½–1½ broad, broadly oblong, or linear and almost strap-shaped, blunt, acute, acuminate or tailed; the base acute, cuneate, truncate, cordate or produced into great lobes above and below, which sometimes lap over those of the pinnæ above it and the rachis, of a very rigid texture, marked with close grooves between the veins; margins finely and minutely toothed. *Terminal pinna* long or short, sometimes erect, and much larger than the lateral ones. *Lowest pinnæ* sometimes obliquely ovate, or even orbicular-reniform. *Fertile pinnæ* on separate fronds, or occupying half (one side) of the sterile, or a few pinnæ or portions of them only are soriferous, narrow linear, 3–8 inches long, sometimes so narrow as to be filiform. *Costa* naked or paleaceous.—There are no limits to the variations of this protean plant, of which the New Zealand botanist should collect and preserve large suites of specimens, with the stipes and rhizome: it is indeed only by such large suites that any accurate idea can be obtained of the species of Ferns, and it is impossible for the student or even the botanist to recognize some of the states of this plant at first sight. About thirty New Zealand specimens were selected for the Hookerian Herbarium, out of many hundreds that I have examined; these show every character I have given in the description, and pass so insensibly one into another, that I find it vain to attempt to limit the varieties. Most of these may further be found in Tasmania, Australia, and South America, together with other varieties not alluded to here. That which I have called *minor* differs in its smaller size, very coriaceous texture, greener colour, and blunter pinnæ.—Plate LXXV., *L. procera*, var. *minor*. Fig. 1, fertile pinnule; 2, portion of ditto; 3, capsules; 4, spores:—*all magnified.*

2. Lomaria *fluviatilis,* Spr.; frondibus cæspitosis linearibus elongatis pinnatis, pinnis sterilibus plurimis membranaceis oblongo-rotundatis lineari-oblongisve obtusis crenatis margine undulatisve infimis breve stipitatis supremis basi lata adnatis confluentibusve, pinnis fertilibus brevibus linearibus erectis obtusis, rachi stipiteque brevi squamis patentibus, rhizomate crinito-paleaceo.—*Spreng. Syst. Veg.* Stegania, *Br. Prodr.* L. rotundifolia, *Raoul, Choix de Plantes, p.* 9. *t.* 2 *B.* L. rotundifolia, *Col. in Tasm. Phil. Journ.*

Hab. New Zealand, *Forster in Herb. Hook.* Mountainous parts of the Northern Island, *Colenso, etc.* Middle and Southern Islands, *Lyall, etc.* (Cultivated at Kew.)

A very distinct species, also found in Tasmania, varying a good deal in size and form of pinnæ, but on the whole a well-marked species. It is curious that both M. Raoul and Mr. Colenso should have overlooked Brown's description of *L. fluviatilis*, and independently adopted the name of *rotundifolia* for this plant.—*Rhizome* stout, often woody, and base of the short stipes thickly clothed with long scales. *Fronds* 8–18 inches high, tufted, very narrow. *Pinnæ* very numerous, sterile, rounded or linear-oblong, blunt, waved or crenate at the tip, ½–1¼ inch long; lower shortly stipitate; upper adnate by a broad base, top ones confluent. *Pinnæ* of the fertile fronds fewer, erect, linear, narrow, blunt, ⅓–⅔ inch long. *Stipes* and *rachis* covered with more or less spreading scales.

3. Lomaria *pumila,* Raoul; frondibus cæspitosis linearibus lineari-lanceolatisve basi angustatis breve stipitatis submembranaceis pinnatis v. superne pinnatifidis, pinnis lineari-oblongis obtusis basi abrupte contractis late adnatisve crenato-dentatis inferioribus rotundatis, fertilibus longe stipitatis pinnatis, pinnis ascendentibus linearibus remotis obtusis mucronatisve, stipite glaberrimo, rachi parce basi dense paleacea.—*Raoul, Choix de Plantes, p.* 10. *t.* 2 *A.*

Hab. Northern and Middle Islands; not uncommon in damp woods, watercourses, etc., *Raoul, Colenso, Lyall, etc.*

A very much smaller plant than *L. fluviatilis* or *L. lanceolata*, to both of which it is nearly allied, differing from *fluviatilis* in the smaller size, paler fronds, glabrous rachis and upper part of stipes, and pinnules being less contracted at the base, and from *lanceolata* in the much smaller size, narrower, more pinnate frond, more membranous texture, and shorter, broader pinnules. From the common large coriaceous state of *L. lanceolata*, with narrow, almost entire, falcate pinnules, it is abundantly distinct; but I have many specimens of both that I am quite at a loss how to distinguish. Most of my specimens have more pinnate fronds, and pinnules more narrowed at the base,

than M. Raoul's. Some specimens resemble *L. Banksii*, but differ in texture and in the narrowed base of the more numerous pinnæ.—*Fronds* tufted, 2 inches to a span high, membranous, pale green, blunt or acute. *Pinnules* coarsely bluntly crenate, especially towards the blunt apices, close set, linear-oblong or rounded, sessile by a broad base, or contracted at the upper or lower end or at both margins; veins distant, forked; upper surface shining. *Lowest pinnæ* remote, rounded, generally attached by a broad base, and running close down to the base of the stipes. *Fertile pinnæ* on longer stipes, of few or many, distant, narrow linear, blunt or apiculate pinnæ. *Stipes* chaffy at the base. *Caudex* large and stout for the size of the plant.

§ b. *Frond pinnatifid, or pinnate, when the lower pinnules are adnate by a very broad base to the rachis.*

4. Lomaria *Vulcanica,* Blume; rhizomate crasso paleis crinito, fronde sterili sublonge stipitata coriacea lanceolata ovata v. ovato-deltoidea pinnatifida basi pinnata, pinnis glabris approximatis falcatis infimis decurvis lanceolatis obtusis acuminatisve integerrimis v. subcrenatis costa nervisque glabris v. villosulis, fertilibus patentibus anguste linearibus basi obtusis acutisve dilatatis, involucris marginalibus laceris, stipite basi crinito.—*Blume, En. Fil. Java. Hook. Ic. Plant. t.* 969. L. deflexa, *Colenso in Tasm. Phil. Journ.*

HAB. Northern Island: Tarawera, East Coast, etc., *Colenso.* Auckland, *Sinclair.* (Cultivated at Kew.)

A very distinct species, easily recognized by the often deltoid coriaceous frond, the two lower pinnæ of which are deflexed. It is found in Tasmania and on the lofty mountains of Java.—*Rhizome* usually very stout and woody, sometimes as thick as the wrist. *Fronds* terminal, 4–18 inches long, tufted, on long stipes, ovate or lanceolate, deltoid, coriaceous. *Pinnæ* close, 1½–3 inches long, falcate, acuminate (rarely blunt), perfectly entire or irregularly crenate, glabrous or pubescent on the costa and nerves below (especially in Java specimens). *Fertile fronds* with much narrower pinnæ, and marginal sori sometimes covering the whole pinna. *Rachis* and *stipes* pale, the latter crinite with long black scaly bristles at the base.—Mr. Colenso has collected a stunted form of this, with a proportionally immense prostrate caudex, such as other species of *Lomaria* often form in dry soils.

5. Lomaria *elongata,* Blume; fronde coriacea glaberrima, sterili pinnatifida (juniore integra lanceolata) in stipitem decurrente, pinnis elongatis lanceolatis acuminatis integerrimis falcatis decurrenti-confluentibus, rachi late alata, costa glaberrima, fronde sterili pinnatifida pinnis anguste lineari-elongatis, involucris laceris, rachi anguste alata, stipitibus robustis laxe squamatis.—L. elongata, *Blume,* et L. punctata, *Blume, En. Plant. Jav. v.* 2. *p.* 201. *Kunze, Farnkr. t.* 137. L. Colensoi, *Hook. Fil. in Ic. Plant. t.* 627, 628. L. heterophylla, *Col. in Tasm. Phil. Journ.*

HAB. Northern and Middle Islands: Waikare Lake, *Colenso.* Port Nicholson, *Sinclair.* Ship Cove, *Lyall.*

An exceedingly handsome Fern, though neither delicate nor finely cut: it is found in Java, Ceylon, and the Neelgherrie Hills of the Indian Peninsula, and closely resembles a South American species, in which however the rachis of the fertile frond does not appear to be winged.—*Fronds* pendulous, very thick and coriaceous, quite smooth and glabrous, 1–3 feet long, deep green and shining. *Sterile* ones broadly ovate, pinnatifid. *Pinnæ* few, remote, a span long, linear-lanceolate, falcate, acuminate, each decurrent and joining that below it, whence the rachis is very broadly winged; lower pinnæ decurrent on the stipes, which is furnished with an irregularly lobed wing. *Fertile fronds* pinnatifid, the segments very long (10 inches) and narrow; *rachis* with a narrow wing. *Stipes* stout, with a few broad scales.—The veinlets often terminate in a little depression within the margin of the pinna, whence probably Blume's name of *L. punctata.*

6. Lomaria *lanceolata,* Br.; frondibus fertilibus utrinque concoloribus submembranaceis cæspitosis glabris anguste elongato-lanceolatis acuminatis basi angustatis breviter stipitatis pinnatifidis basi pinnatis, pinnis plurimis approximatis oblongo-lanceolatis obtusis acutis v. acuminatis subfalcatis integerrimis v.

subsinuato-crenatis, infimis rotundatis nunc discretis, rachi costaque glaberrima, fronde fertili sterilibus breviore, pinnis patentibus linearibus acutis v. acuminatis, stipite basi squamato subcrinito.—*Spr. Syst. Veg. Hook. Ic. Plant. t.* 429. *A. Cunn. Prodr.* L. obtusata, *Lab. Sert. Nov. Caled. t.* 6. Stegania, *Br. Prodr. A. Rich. Flor. Endl. Prodr. Flor. Ins. Norf.*

Hab. Throughout the Islands; abundant. (Cultivated at Kew.)

A common Tasmanian plant, also found in Australia, and as far south as Lord Auckland's Group; an apparently identical species occurs in the Society Islands, and in tropical and extra-tropical South America.—*Fronds* tufted, on a very short, erect caudex, 2 inches to 2 feet high, firm in texture, but not coriaceous, pale green, paler below; barren ones quite glabrous, long, linear-lanceolate, acuminate, much narrowed below, often produced to the base of the short stipes, pinnate below, pinnatifid above. *Pinnæ* very numerous and close, narrow or broadly oblong-lanceolate, ½–2 inches long, blunt or sharp, quite entire or bluntly toothed towards the tip, transversely ribbed by the forked veins. *Fertile fronds* shorter; pinnæ distant, spreading, narrow linear, acute or acuminate. *Rachis* and *costæ* quite smooth and glabrous. *Stipes* with long subulate blackish scales at the base.—Norfolk Island specimens are very much larger than New Zealand ones, and have almost filiform fertile pinnæ, with subulate tips. The *L. nigra* is possibly a state of this species, which it resembles in the acute tips to the fertile pinnæ.

7. Lomaria *discolor*, Willd.; frondibus cæspitosis, fertilibus glaberrimis subcoriaceis subtus discoloribus rufo-brunneis (rarius concoloribus) pinnatifidis (basi sæpius pinnatis) elongato-lanceolatis acutis basi angustatis, pinnis plurimis (subpectinatis) divaricatis approximatis sinu angusto acuto lineari-lanceolatis obtusis acutis acuminatisve infimis brevibus integerrimis v. obscure sinuatis, costa rachique glaberrimis, fronde fertili plerumque pinnatifida pinnis obtusis basi dilatatis nudis inferioribus sterilibus rarius pinnata pinnis basi substipitatis, costa valida atra, stipite brevi basi paleaceo.—*Willd. Sp. Pl. A. Cunn. Prodr.* Stegania discolor, *A. Rich. Flor.* Hemionitis discolor, *Schk. Fil. t.* 6 (*sub nom.* H. rufa). Onoclea nuda, *Lab. Fl. Nov. Holl. v.* 2. *p.* 96. *t.* 246. Stegania falcata, *Br. Prodr.*

Hab. Throughout the Islands; abundant. (Cultivated at Kew.)

It is generally easy to distinguish this from *L. lanceolata* by the red colour of the under surface of the frond, but this is not always the case either in New Zealand or in Australian and Tasmanian specimens. Labillardière hence made a new species of the Tasmanian, which has been retained by Mr. Brown; but I find specimens from that island to be as red below as those from New Zealand, and there is no other character whereby to separate them.—*Fronds* tufted on the top of a very short, woolly, erect, thick caudex, forming an elegant crown; 1–3 feet long, narrow linear-lanceolate, perfectly glabrous, rather coriaceous, pinnatifid. *Pinnæ* very numerous, close, and placed at right angles to the rachis, with a narrow slit between the contiguous pairs, straight, linear-oblong or lanceolate, blunt, sharp or acuminate, 1½–4 inches long, obscurely serrate or quite entire; lowest smaller, sometimes distant. *Fertile fronds* pinnate or pinnatifid; pinnæ spreading, stout, linear, dilated, adnate, and leafy or contracted, and almost stipitate at the base; lower pinnæ often quite barren, and like those of the barren frond. *Costa* and *rachis* quite smooth, the latter very stout, often black, deeply channelled in front. *Stipes* short, stout, scaly at the base.

8. Lomaria *alpina*, Spr.; glaberrima, fronde sterili stipitata anguste lineari profunde pinnatifida v. pinnata, pinnis approximatis basi lata sessilibus oblongis obtusis coriaceis inferioribus minoribus coriaceis, costa tenui, rachi valida, fronde fertili elongata sterilibus longiore pinnata, pinnis lineari-oblongis obtusis divaricatis curvis, infimis parvis remotis sterilibus, stipite valido nudo v. sparse squamato, rhizomate cæspitoso repente squamoso.—*Spr. Syst. Veg. Flor. Antarct. p.* 392. *t.* 150. L. polypodioides, *Gaud. in Freyc. Voy. Bot.* L. Antarctica, *Carm. Fl. Ins. Trist. d'Acunha.* L. linearis, *Colenso in Tasm. Phil. Journ. v.* 2. *p.* 176. Stegania alpina, *Br. Prodr.*

Hab. Mountainous parts of the Northern, and throughout the Middle and Southern Islands; abundant. (Cultivated at Kew.)

A very abundant plant in South Chili, Fuegia, and the Falkland Islands; also found in Juan Fernandez, Tristan d'Acunha, Kerguelen's Land, and on the Tasmanian Mountains. It is a small, coriaceous species, with creeping rhizome and very cæspitose narrow fronds, of which the fertile are always much the longest; weak, elongated specimens have less coriaceous fronds, with obscurely sinuate pinnules.—*Fronds* 2 inches to 2 feet high, with long stipes, linear, $\frac{1}{2}$–$\frac{3}{4}$ inch broad, narrowed above and below, deeply pinnatifid or pinnate. *Pinnæ* 20–50 pairs, very close together, linear-oblong, blunt, sessile on very broad bases. *Fertile fronds* pinnate; pinnæ spreading, sometimes deflexed, remote, linear, blunt, curving upwards, rarely straight and short, lowest remote, small, rounded, often without sori; *involucres* distinct, scarious. *Rachis* and *stipes* stout, smooth, sometimes with a few paleæ. *Rhizome* paleaceous.

9. Lomaria *Banksii,* Hook. fil.; glaberrima, fronde sterili brevissime stipitata anguste lineari profunde pinnatifida basi pinnata, pinnis brevibus remotis semi-orbicularibus infimis latioribus quam longis sæpissime confluentibus ad basin stipitis decurrentibus, fronde fertili sterilibus breviore pinnata, pinnis patentibus remotis late lineari-oblongis obtusis, rhizomate valido ascendente. Osmunda obtusa, *Banks et Sol. MSS.* (Tab. LXXVI.)

Hab. Throughout the Islands, in dark woods, but rare, *Banks and Solander.* Dusky Bay, *Menzies.* Bay of Islands, *A. Cunningham.* East Coast, *Colenso.* Auckland, *Sinclair.* Middle and South Islands, *Lyall.*

Intermediate in some respects between *L. lanceolata* and *L. alpina;* readily distinguished from the latter by its stout, ascending stipes, fronds pinnate or pinnatifid to the very base, by the fertile fronds being shorter than the barren, and by the remote, much broader, semi-orbicular pinnæ.—*Rhizome* in full-grown specimens prostrate below, ascending, several inches long, stout, woody, covered with strong matted fibres, its crown paleaceous. *Fronds* numerous, coriaceous, 6 inches to $1\frac{1}{2}$ foot high, forming a tuft on the top of the rhizome. *Stipes* and *rachis* very stout, naked. *Barren fronds* pinnate. *Pinnæ* 18–30 pairs, semi-orbicular or broadly oblong, rounded, entire, coriaceous, sessile by a very broad base; the lower confluent and decurrent to the very base of the stipes, often forming a sinuous wing to the latter. *Fertile fronds* 6–8, much shorter and smaller than the barren, pinnate. *Pinnæ* remote, short, broadly oblong, blunt, spreading, curved or straight.—Plate LXXVI. Fig. 1, barren pinnule; 2, fertile ditto; 3, sori; 4, capsule; 5, spores:—*all magnified.*

10. Lomaria *nigra,* Colenso; parvula, luride viridis, frondibus sterilibus pinnatis superioribus sublyrato-pinnatifidis, pinnis paucis subinterruptis oblongis obtusis sinuato-crenatis glaberrimis infimis sæpius majoribus subdeflexis stipitatis marginibus costis rariusque paginis inferioribus pubescentibus terminali maxima basi lobata, fertilibus pinnatis, pinnis paucis distantibus suberectis anguste linearibus apice subulatis acuminatis v. apiculatis terminali elongata, rachi stipitibusque sparse paleaceis.—*Col. in Tasm. Phil. Journ. Hook. Ic. Plant. t.* 960.

Hab. Northern Island: east coast and interior, *Colenso, Sinclair, etc.* Milford and Bligh's Sound, *Lyall.*

An anomalous-looking plant, with blackish or lurid membranous fronds, brittle when dry, a span long.—*Pinnules* few in number, irregularly placed, broadly oblong, blunt, often erose, sinuate, irregular in outline, the terminal generally very large and lobed, the lower pair much larger than those above them, stalked. *Fertile fronds* slender, with a few very slender acuminate distant pinnæ; the upper very long, erect.—The habit and paleaceous rachis resemble those of *L. fluviatilis;* in its ordinary state the lyrate frond sufficiently distinguishes this, but its other characters are not very marked; the narrow fertile pinnæ with subulate tips, resemble those of *L. lanceolata.* The pubescence consists of short tomentum, which is rufous when dry, sometimes spread over the whole under surface of the pinnules, at others confined to the margins and costæ, or wholly absent.

§ c. *Frond bipinnatifid.*

11. Lomaria *Fraseri,* A. Cunn.; caudice valido elongato suberecto, frondibus cæspitosis ovatis v.

ovato-lanceolatis acuminatis bipinnatifidis glaberrimis, pinnis primariis lineari-lanceolatis apice angustatis profunde pinnatifidis, pinnulis lineari-oblongis, acutis subfalcatis integerrimis serratisve, rachi stipiteque ala interrupta acute angulato-lobata marginata costisque glaberrimis, stipite basi squamoso, fronde fertili pinnulis lineari-ellipticis substipitatis apiculatis, involucris integris reflexis nudis.—*A. Cunn. Prodr. Hook. Ic. Plant. t.* 185.

HAB. Northern Island, and northern parts of the Middle Island; rare. Bay of Islands, *Fraser, etc.* Massacre Bay, *Lyall.*

This is quite unlike any other species, and is found nowhere but in New Zealand.—*Caudex*, or *rhizome*, sometimes 2–3 feet long, as thick as the thumb, covered with the bases of the old stipites. *Fronds* numerous, a span to $1\frac{1}{2}$ foot long, ovate, bipinnatifid, quite glabrous, rather membranous. *Primary pinnæ* 2–4 inches long, $\frac{2}{3}$ broad, tapering to a long point, pinnatifid nearly to the costa; segments close together, linear-oblong, acute, quite entire or serrate. *Rachis* margined irregularly with a sharply angled and lobed wing, that is produced downwards nearly to the base of the stipes, where the latter is scaly. *Fertile fronds* like the barren, but narrower, and the primary pinnæ are often again pinnate, caudate, and their segments are adnate, or shortly stipitate. *Involucres* marginal, curving away from the sorus.

Gen. XV. ASPLENIUM, *L.*

Sori lineares, sparsi, superficie (rarius margine) frondis, venis parallelæ. *Involucrum* e vena lateraliter ortum ducens, margine superiore libero.

One of the largest and most widely diffused genera of Ferns, of which the species also have an extensive geographical distribution. The New Zealand kinds have defied all attempts to be limited by words, and, with the exception of *A. flabellifolium* and *polyodon*, I know of no two, however dissimilar, that can well be distinguished at first sight from one another by descriptions. I have examined upwards of a thousand specimens from all parts of the islands, for which I am especially indebted to Dr. Lyall's splendid collections, which contained copious suites of full-sized specimens of every form. These presented many intermediate states between *A. lucidum*, *A. flaccidum*, *A. bulbiferum*, and *A. obtusatum*; every attempt to draw a limit to any of the above-named forms by words failed; size, colour, texture, amount of scales, mode of growth, amount and form of cutting or division of the fronds, length, breadth, and position of sori vary with every specimen and at every locality; and sometimes, when I did fancy I had found a diagnostic character between Dr. Lyall's specimens, those of Dr. Sinclair, Mr. Colenso, or my own, would come in to render it of no avail. Nearly all the New Zealand forms are abundant, and equally variable in other localities, and especially in similarly damp insular climates, which are not only favourable to a rich and varied Fern-vegetation, but seem to favour the variations of the species themselves. The limits ascribed to the above-named species in the following pages, I regard as quite arbitrary; I described what I supposed to represent the most generally distinct forms known to me; but it must be borne in mind, that I may often have called that the prevalent or typical state of a plant, of which I happen to have the most specimens, or that which I gathered myself most commonly. Careful observations of all the species over extensive areas can alone indicate what should be regarded as the typical state of a plant; and I would caution the New Zealand student against expressing any decided opinion on the New Zealand *Asplenia*, till he has arranged a large herbarium of them, from all parts of the islands, and compared the specimens with one another, and with those from other parts of the world.—The genus is distinguished by bearing on the back of the frond linear sori, covered with a linear membranous involucre. *Involucre* attached lengthwise to a veinlet (with which the sori are parallel), opening lengthwise and inwards; sometimes the fronds are cut, or divided between every veinlet, when the sori become marginal, and the involucres appear to open outwards, but if the whole pinna be carefully regarded, it will be seen that the involucre really opens towards its costa. (Name from *α*, privative, and *σπλην*, *the spleen*; in allusion to some supposed medicinal qualities.)

§ a. *Fronds simply pinnate: pinnæ toothed, scarcely lobed. In* A. lucidum *the lower pinnæ are sometimes pinnate at the base.*

1. Asplenium *flabellifolium*, Cav.; parvulum, flaccidum, frondibus decumbentibus lineari-elongatis pinnatis, pinnis rhombeis breviter stipitatis antice crenato-dentatis, rachi lævi filiformi apice elongato radicante.—*Cav. Sw. Fil. p.* 81. *t.* 31. *f.* 2. *Br. Prodr. A. Cunn. Prodr.*

Hab. Northern and Middle Islands, but not very common; Bay of Islands, *Cunningham, etc.* East Coast, *Colenso.* Auckland, *Sinclair.* Banks' Peninsula, *Raoul, etc.* (Cultivated at Kew.)

A common Tasmanian and Australian species, very closely allied to a Chili one.—*Fronds* tufted, straggling, prostrate or pendulous, slender, weak, flaccid, 3–8 inches long, pinnate, quite glabrous. *Pinnæ* very variable in size and shape, $\frac{1}{4}$–$\frac{2}{3}$ inch long, shortly stipitate, rhomboid or orbicular, broadly cuneate or rarely reniform at the base, outer margin coarsely crenate or lobed. *Sori* radiating from the base of the pinna. *Rachis* filiform, elongated, its apex without pinnæ, often rooting.—This is a very distinct species from any of the following.

2. Asplenium *obtusatum*, Forst.; frondibus coriaceis cæspitosis erectis v. pendulis pinnatis, pinnis breviter stipitatis oblongis oblongo-lanceolatisve obtusis acutis acuminatisve serratis crenatisve basi oblique cuneatis rotundatis truncatisve, rachi crassa marginata glaberrima v. sparse subsquamoso-pilosa, stipite basi squamato squamis nitidis.

Var. *α*; fronde erecta, pinnis valde coriaceis obtusis acuminatisve, venis ut plurimum simplicibus. A. obtusatum, *Forst. Prodr. Lab. Fl. Nov. Holl. v.* 2. *p.* 93. *t.* 242. *f.* 2. *Br. Prodr. Schkuhr, Fil. v.* 1. *p.* 6. *t.* 68. *Fl. Antarct. p.* 108.

Var. *β. obliquum*; pinnis coriaceis elongatis lanceolatis acuminatis, soris linearibus, venis subremotis simplicibus furcatisve.—*Fl. Antarct. p.* 108. A. obliquum, *Forst. Prodr. Schkuhr, Fil. t.* 71. *Lab. l. c. t.* 242. *f.* 1. A. oblongifolium, *Col. in Tasm. Phil. Journ.*

Hab. Var. *α* and *β* very abundant throughout the Islands, *Forster, etc.* Nat. name, "Paretao," *Col.* (Cultivated at Kew.)

The form I have called var. *α* is an extremely abundant Fern in the southern hemisphere, especially on maritime rocks, and represents in these regions its very near ally, the common *A. marinum* of England, from which it differs chiefly in the upper pinnæ being confluent into a broader terminal pinna, and in the generally simple veins; characters which I fear may break down.—*Fronds* very thick and leathery, tufted, 3 inches to 3 feet long, erect or pendulous, pinnate; pinnæ 1–4 inches long, stalked, linear- or oblong-lanceolate or oblong, blunt or sharp; base truncate, cuneate, or rounded; margin coarsely crenate or serrate. *Veins* often quite simple. *Rachis* very stout, compressed, margined, glabrous or with a few scattered soft hairs. *Stipes* covered at the base with long, broad, erect, shining, subulate scales.—Small plants have only one or two pairs of pinnæ, which are often short and blunt. Sometimes the lower pinnæ are lobed or pinnate at the base. As the fronds become more flaccid, the pinnæ larger, broader, more acuminate, and the rachis more slender, this passes into the following.

3. Asplenium *lucidum*, Forst.; frondibus submembranaceis cæspitosis pinnatis, pinnis ovato- v. oblongo-lanceolatis longe acuminatis stipitatis basi angustatis grosse crenatis, soris elongatis, rachi gracili non marginata, stipite basi squamato, squamis nitidis.—*Forst. Prodr. Schk. Fil. t.* 72. *A. Cunn. Prodr.* A. obtusatum, var., *A. Rich. Flor.*

Var. *β. Lyallii*; pinnis duplicato-serratis, inferioribus basi pinnatis, pinnulis oblique ovato- v. lineari-oblongis obtusis. (Tab. LXXVII.)

Hab. Abundant in woods and throughout the Islands. (Cultivated at Kew.) Var. *β*. Middle Island, Otago, *Lyall.*

Most probably only a variety of *A. obtusatum*, but a very distinct-looking one in its ordinary state. It may be

distinguished by its larger size, more membranous texture, deeper green colour, shining surface, more narrowed pinnæ, which have longer stalks, and by the rachis not being margined. The var. β is a very remarkable one, having the upper pinnæ exactly as in the common states of the plant, but the lower ones coarsely doubly crenate and pinnate at the base; the individual pinnæ are of the same shape as those of *A. obtusatum.*—PLATE LXXVII. *A. obtusatum,* var. *Lyallii.* Fig. 1, 2, portions of frond; 3, capsule:—*magnified.*

4. Asplenium *polyodon,* Forst.; frondibus coriaceis pinnatis linearibus lineari-lanceolatisve, pinnis plurimis falcatis elongato-lanceolatis angustato-acuminatis grosse inciso-serratis incisuris serrulatis basi petiolatis oblique cuneatis antice subdilatatis, rachi patentim paleacea rarius glabrata.—*Forst. Prodr.* A. falcatum, *Sw. Br. Prodr. A. Rich. Flor. Endl. Prodr. Flor. Ins. Norf. A. Cunn. Prodr.* A. Forsterianum, *Col. in Tasm. Phil. Journ.* Tarachia polyodon, *Presl, Epimel. p.* 76.

Var. β; pinnis inferioribus lobatis, lobis serrulatis.

HAB. Northern and Middle Islands; from the Bay of Islands to Akaroa. (Cultivated at Kew.) β. Port Nicholson, *Lyall.*

A very common species in all tropical and most south temperate regions, though not found in Tasmania; it cannot be confounded with any other New Zealand one.—*Fronds* coriaceous, lurid green, 1½–2½ feet long, narrow, linear-lanceolate, pinnate. *Pinnæ* fifteen to twenty-five pair, distant, very numerous, stipitate, narrow lanceolate, tapering from an obliquely cuneate base to a tapering point, falcate, curved upwards, 2–5 inches long, ½–¾ inch broad, coarsely inciso-serrate or almost lobed, each segment toothed along the outer edge. *Rachis* with spreading scaly hairs, rarely quite glabrous. *Stipes* paleaceous at the base.—In var. β the pinnæ are broader, lobed along the margin, the lobes serrate.

§ b. *Fronds bipinnatifid, bipinnate or decompound, sometimes irregularly divided into many elongated pinnules. Sori on the backs or margins of the lobes.*

5. Asplenium *bulbiferum,* Forst.; fronde lanceolata flaccida glabra sæpius prolifera, pinnis primariis elongato-lanceolatis acuminatis, rachi marginata v. elata, pinnulis lineari-oblongis stipitatis inciso-lobatis soris (brevibus) margine remotis v. inciso-pinnatifidis soris marginalibus, lobulis obtusis, rachi glabrata v. parce paleacea, stipite subcompresso basi nudiusculo.—*Forst. Prodr. Schk. Fil. t.* 79. *A. Rich. Flor. A. Cunn. Prodr. Hook. Ic. Pl. t.* 423.

Var. β. *laxa;* frondibus sæpius pendulis minoribus. A. laxum, *Br. Prodr.*

Var. γ; frondibus pendulis, pinnis inciso-lobatis basi pinnatis, pinnulis obovatis obtuse incisis.

Var. δ. *tripinnatum;* fronde erecta ampla, pinnis secundariis pinnatis, pinnulis oblongo-lanceolatis stipitatis obtuse crenato-lobatis.

Var. ε. *triste;* fronde elongata, pinnis primariis supra medium oblongo-lanceolatis crenatis basin versus pinnatis, pinnis paucis remotis stipitatis oblongo-ovatis obtusis subcrenatis. A. triste, *Raoul, Choix de Plantes, p.* 10.

HAB. Throughout the Islands, abundant. (Cultivated at Kew.)

The most highly developed form of this Fern is a very beautiful one, and easily recognized by its habit of bearing germinating bulbs on its pinnules, whence its name; but this character is not always present, and then the species becomes *A. laxum,* Br. The latter, a Tasmanian plant, was distinguished by Mr. Brown from this by not bearing bulbs; but Mr. Gunn has collected bulbiferous specimens that are identical with the New Zealand ones. *Pendulous* specimens of this appear to pass into *A. flaccidum;* and small states with lobed broad pinnules through *A. triste* into *A. adiantoides.* It is quite in vain to attempt to limit these species by words.—*Fronds* 1–3 feet high, flaccid, glabrous, broadly ovate-lanceolate or linear-lanceolate, erect or pendulous, bright green, not so pale and coriaceous as in *A. flaccidum,* nor so membranous as in *A. adiantoides;* pinnæ bi-tripinnate, generally bipinnate. *Pinnæ* 6–10 inches long, with a margined or winged rachis; *pinnules* stipitate, linear-obovate or oblong, or broadly

ovate, lobed or pinnatifid. *Sori* short, marginal in pinnatifid fronds; sometimes the fronds are simply pinnate, and the pinnæ lanceolate-lobed or toothed, or pinnate below and lobed above, or sometimes the pinnules are distant and stalked, or pinnatifidly cut into linear distant lobes, as in *A. flaccidum*. *Rachis* glabrous, or with a few scattered paleæ. *Stipes* generally compressed or angled, sometimes margined, more or less paleaceous at the base.—The young fronds of this species were formerly an article of food amongst the natives.

6. Asplenium *adiantoides*, Raoul; flaccidum, tenerum, frondibus cæspitosis brevibus (rarius elongatis) late ovatis lanceolatisve laxe bipinnatis rarius pinnatis, pinnulis paucis distantibus longe gracile stipitatis rhombeis lobatis inciso-lobatisve, soris margine remotis, rachibus gracilibus v. filiformibus parce squamosis glabratisve, stipite basi paleaceo.—*Raoul, Choix de Plantes, p.* 10. *t.* 1.

Var. *α. Hookeriana;* minor, frondibus minoribus pinnatis bipinnatisve.—*Nob. in Hook. Ic. Plant. t.* 983. A. Hookerianum, *Col. in Tasm. Phil. Journ.*

Var. *β. Colensoi;* pinnulis approximatis brevius stipitatis late obovatis profunde incisis, segmentis linearibus integris v. furcatis.—A. Colensoi, *Col. in Tasm. Phil. Journ.*

Hab. Northern and Middle Islands: Banks' Peninsula, *Raoul, Lyall*. East Coast and interior, *Colenso*. Var. *β*. Keri-keri River, *A. Cunningham in Herb. Hook.* Tuki-tuki River and Waikare Lake, *Colenso*.

A very pretty little Fern, much the smallest New Zealand species, and closely allied to the Fuegian *A. Magellanicum*.—*Fronds* tufted, with fibrous roots, 2–6 inches long, slender, flaccid, delicate, glabrous, pinnate or bipinnate, with remote rhomboid pinnules on long slender stalks. *Involucres* short, remote from the margins.—Dr. Lyall sends a fragment of a specimen from Banks' Peninsula upwards of a span long, with a stouter rachis, which bears scattered hairs; it approaches some states of *A. bulbiferum*.

7. Asplenium *Richardi*, Hook. fil.; erectum, spithamæum, subcoriaceum, fronde bipinnata ovato-lanceolata subflaccida, pinnis plurimis breviusculis lineari-oblongis subacutis infra medium pinnatis versus apicem profunde pinnatifidis, pinnulis plurimis approximatis brevi et late stipitatis late obovatis pinnatifido-lobatis, lobulis obtusis, soris lobulis marginalibus, rachi marginata subsquamosa, stipite sparse squamoso, rhizomate brevi paleis latis acuminatis tecto.—A. adiantoides, *var.* Richardi, *Hook. Ic. Pl. t.* 977.

Hab. Southern Island: New River, *Hb. A. Richard*.

This is an exceedingly different-looking plant from any of the above, though, from having only one specimen, I advance it as new with much hesitation. It resembles some forms of the Cape *Aspl. furcatum*, more nearly than any New Zealand species, from all which latter it differs in the close and very finely cut pinna. The var. δ of *A. flaccidum* can only well be distinguished from it by the very thick leathery texture of its fronds, and larger size and less cut pinnæ; in other respects it approaches it so closely that I doubt their eventually proving distinct.—*Rhizome* very short, with many strong woolly fibres, and erect, membranous, brown, shining scales. *Fronds* tufted, a span long, erect, linear-ovate or lanceolate, bipinnate, glabrous, dark green, scarcely membranous. *Pinnæ* numerous, stipitate, linear-oblong, 1 inch long, deeply pinnatifid towards the apex, pinnate below. *Pinnules* close, $\frac{1}{8}$ inch long, shortly stipitate, broadly ovate, deeply lobed; lobes blunt, short, with short marginal sori.

8. Asplenium *flaccidum*, Forst.; frondibus cæspitosis crasse coriaceis erectis v. pendulis ovatis oblongis loricatisve rigidis v. flaccidis pinnatis bipinnatis v. laxe dichotome ramosis, ramis pinnisve brevibus v. valde elongatis remotis v. approximatis simplicibus pinnatifidis pinnatisve, lobis pinnisve varie sectis ultimis plerisque linearibus obtusis, soris lobulis marginalibus rarius dorsalibus, rachi glabra marginata, stipite basi paleaceo, rhizomate fibroso squamis latis longe acuminatis aucto.—*Forst. Prodr. Fl. Antarct. p.* 109. C. Novæ-Zelandiæ, *Spr. Syst. Veg. Schk. Crypt. t.* 82. A. heterophyllum, *A. Rich. Flor., non Br.* Cœnopteris flaccida, *A. Cunn. Flor.* Darea flaccida *et* D. odontites, *Willd. Sp. Pl.*

Hab. Throughout the Islands, very abundant. (Cultivated at Kew.) Nat. name, "Pohutukawa," *Colenso*.

Var. *α*; frondibus pendulis bipinnatifidis, pinnis distantibus elongatis angustatis loricatis parum divisis profunde lobato-pinnatifidis, lobis angustis obtusis.

Var. *β*; frondibus pendulis pinnatis, pinnis subintegris inciso-dentatisve, lobulis linearibus obtusis, soris lobulis marginalibus.

Var. *γ*; frondibus erectis pendulisve pinnatis, pinnis anguste falcato-lanceolatis acuminatis pinnatifido-lobatis, soris dorsalibus v. parte superiore sori secus lobuli marginem productis.

Var. *δ*; fronde erecta rigida deltoidea bipinnata, pinnis ovatis v. ovato-lanceolatis apice pinnatifidis basi pinnatis, pinnulis breve et crasse stipitatis obtuse lobato-pinnatifidis.

This Fern is very common, and perhaps the most variable in New Zealand, but not so much so in Australia and Tasmania; it is always of a very thick texture, bright shining green colour, and very flaccid. It passes by many states into *A. bulbiferum*, var. *laxum*, and other varieties of that plant, and it would take many pages to enumerate half its protean forms. Of these the most conspicuous are,—Var. *α*, a very common form: *fronds* numerous, pendulous, sparingly divided into distant, narrow, pinnatifid or lobed thongs, many inches long; lobes narrow, blunt, with marginal sori.—Var. *β*. *Fronds* pendulous, flaccid, linear ovate, distantly pinnate; *pinnæ* stipitate, very long, quite entire, crenate or incise.—Var. *γ*. *Fronds* erect or pendulous, pinnate; *pinnæ* falcate, long, narrow, stipitate, rigid (when dry); margins deeply lobed or pinnatifid; *sori* on the pinnæ, but partly produced on to the lobules, hence their upper part is marginal.—Var. *δ*. *Fronds* erect, rigid, deltoid, bipinnate; *pinnæ* ovate or lanceolate; *pinnules* close, ovate, shortly stalked, deeply lobed or pinnatifid.—The above states or varieties are connected by innumerable intermediate ones; indeed the most opposite characters are sometimes presented by different parts of the same frond.

§ ALLANTODIA.—*Involucre membranous, arched, both margins attached to the vein, hence cylindrical.*

9. Asplenium (Allantodia) *Brownii*, J. Sm.; fronde ampla membranacea deltoidea flaccida bi-tri-pinnata, pinnis lineari-oblongis acutis, pinnulis oblongo-lanceolatis obtusis v. acuminatis profunde pinnatifidis, lobis oblongis obtusis integerrimis crenatis inciso-serratisve, rachibus glaberrimis flexuosis, stipite lævi glabro v. basi subsquamato. Asplenium Brownianum, *J. Sm. Gen. Fil. et Bot. Mag. Suppl. v.* 72. *p.* 30. *Hook. Ic. Plant. t.* 978. Athyrium australe, *Presl, Pterid. p.* 98. *Fée, Gen. Fil. p.* 186. Allantodia australis, *Br. Prodr.* A. tenera, *A. Cunn. Prodr.*

HAB. Northern Island, in damp places in woods. Bay of Islands, *A. Cunningham, etc.* Auckland, *Sinclair.*

One of the most delicate and beautiful Ferns in New Zealand; also found in Norfolk Island and in Tasmania, and very similar to, if not identical with, species from the Malay and Society Islands, East Indies, and South America.—*Fronds* very membranous, flaccid, quite glabrous, 2–3 feet high, broadly deltoid, spreading, bi-tri-pinnate. *Primary pinnæ* linear-oblong, acute or acuminate; *secondary* (or pinnules) 1–2 inches long, oblong-lanceolate, shortly stipitate, pinnatifid or pinnate; *segments* linear-oblong, blunt, crenate or inciso-serrate, rarely quite entire. *Sori* generally numerous, 1–2 lines long, nearer the costa than the margin. *Rachis* quite glabrous, slender, rather flexuous. *Stipes* long, smooth, glabrous, or scaly at the base.—Small specimens of this plant, growing in drier situations, have narrower fronds, not so membranous, and nearly entire lobes of the pinnules.

Gen. XVI. DOODIA, *Br.*

Sori lunulati v. lineares, 1–2-seriati, costæ paralleli. *Involucrum* e ramulo anastomosante venæ ortum, planum, intus liberum.

A small genus of Ferns, natives chiefly of the Tropics and south temperate zone, being found in India, the Malay and Pacific Islands, and in Australia and Tasmania.—*Fronds* in *D. caudata* very harsh, coriaceous, erect,

3–18 inches long, tufted, linear-lanceolate, pinnate, the apex often dilated or running out into a linear tail. *Rachis* glabrous or pubescent. *Stipes* short. *Pinnæ* ½–2 inches long, spreading; upper confluent or adnate by a broad base, linear-oblong or ovate-oblong, blunt; the lower smaller, shortly stipitate, cordate, truncate, rounded or sub-dilated at the base, sharply toothed, glabrous or pubescent below; the veins prominent when dry, forked, united by a transverse branch. *Sori* short, linear or crescent-shaped, on the back of the pinnæ, forming one or two rows parallel to one another on each side of the costa. *Involucre* linear, placed on an arching veinlet that joins two veins, opening towards the costa. (Named in honour of *S. Doody*, an old author on English Crypt. Botany.)

1. Doodia *caudata*, *Br. Prodr.* *A. Rich. Flor.* *A. Cunn. Prodr.* *Hook. Exot. Flor. t.* 25. D. Kunthiana, *Endl. Prodr. Flor. Ins. Norf.* *Gaud. in Freyc. Voy. Bot. p.* 401. *t.* 14. *A. Cunn. Prodr.* D. aspera, *Br. Prodr.* *A. Rich. Flor.* *A. Cunn. Prodr.*

Hab. Abundant on dry hills from the Bay of Islands to Banks' Peninsula. (Cultivated at Kew.)

I am quite unable to detect such differences amongst the New Zealand specimens of *Doodia* as would justify my retaining *D. Kunthiana* or *D. aspera* even as varieties of *D. caudata*, which is far from being a very variable plant, considering the Natural Order to which it belongs. *D. aspera* was founded chiefly on the roughness of the rachis and stipes, which are often smooth in one part and glabrous in another; *D. Kunthiana*, on the cordate base of the lower pinnæ.

Gen. XVII. POLYSTICHUM, *Schott.*

Sori globosi, dorsales, medio venarum venularumque inserti. *Involucrum* orbiculare, peltatim medio sori affixum, substipitatum, undique liberum.

A very large genus of Ferns, found in all parts of the globe, and of which the species also are very widely distributed and variable.—*Fronds* bi-tri-pinnate, coriaceous, lobed, serrate or spinulose. *Sori* round, placed on the middle of the veins, at the back of the pinnules, remote from the margin. *Involucre* orbicular, peltately attached by a short stalk to the centre of the sorus, its edges free all round. (Name from πολυς, *many*, and στιχος, *a row;* from the numerous sori.)

1. Polystichum *coriaceum*, Presl; rhizomate elongato repente squamato, fronde pinnata v. bipinnata coriacea ovato-oblonga deltoidea, pinnis superioribus pinnatifidis, inferioribus (rarius omnibus) pinnatis, pinnulis ovato- v. lineari-oblongis stipitatis superioribus crenatis inferioribus pinnatifido-lobatis obtusis integerrimis crenatisve, rachi squamosa, stipite paleaceo.—*Presl, Pterid.* Aspidium, *Br. Prodr.* *Schk. Fil. t.* 50. *Endl. Prodr. Fl. Ins. Norf.* *A. Rich. Flor.* *A. Cunn. Prodr.* A. Cunninghamianum, *Col. in Tasm. Phil. Journ.*

Hab. Common throughout the Islands. (Cultivated at Kew.)

A common tropical Asiatic and Pacific Island plant; also found in Australia and Tasmania, and in South America from Brazil to South Chili. It varies a good deal in stature and amount of division of the fronds, number, distance, and length of the pinnæ: the fronds are always extremely coriaceous and pale brown when dry.—*Rhizome* stout, creeping, clothed with large membranous scales. *Frond* 6–24 inches high, very firm and thick in texture, ovate, deltoid or oblong-lanceolate, pinnate or bipinnate. *Pinnules* stalked, ovate or linear-oblong, entire or lobed; lobes rounded, quite entire or crenate. *Sori* large, brown or black. *Rachis* generally with spreading, scale-like hairs. *Stipes* stout, covered with scattered large paleæ, rarely naked.

2. Polystichum *aristatum*, Presl; rhizomate brevi, fronde ovato-deltoidea v. lanceolata valde coriacea glabra pinnata v. bipinnata, pinnis pinnatifidis, pinnulis basi lata adnatis stipitatisve ovato- v. lineari-oblongis pungentibus argute serratis pinnatifidisve, lobis pungentibus, rachi laxe paleacea, stipite basi squamato.—*Presl, Pterid.* Aspidium aristatum, *Swartz.* A. coriaceum, *var.* acutidentatum, *A. Rich. Flor.* (Tab. LXXVIII.)

Hab. From the Bay of Islands to Banks' Peninsula; on rocks, etc. (Cultivated at Kew.)

Rhizome short and stout, very different from that of *P. coriaceum*, from which it further differs chiefly in the acute pungent lobes of the pinnules.—The species is not so widely distributed as the former, though found in Norfolk Island, Java, and the Cape of Good Hope.—Plate LXXVIII. Fig. 1–8, upper and under surfaces of pinnules from different varieties; 9, involucres:—*all magnified.*

3. Polystichum *hispidum*, J. Sm.; rhizomate repente crasso dense crinito, fronde ovato-deltoidea tri-quadripinnata, pinnulis lineari-oblongis acutis inciso-pinnatifidis, lobulis pungentibus integerrimis bis-ter-dentatisve, soris parvis, stipite rachique pilis longis rigidis patentibus hispido v. crinito.—*J. Sm. Gen. Ferns, p.* 83. P. Schkuhrii, *Presl, Pterid.* Aspidium, *Swartz. A. Rich. Flor. A. Cunn. Prodr.* A. setosum, *Schk. Fil. t.* 49.

Hab. Throughout the Islands, abundant. (Cultivated at Kew.)

A very beautiful Fern, found only in New Zealand, remarkable for its very finely cut fronds, and the long stiff black spreading hairs on the rachis and stipes.—*Frond* 1–3 feet high, tri-quadri-pinnate, rather coriaceous; primary pinnæ linear-oblong, acuminate: secondary the same shape, shortly stipitate, pinnatifid or again pinnate. *Pinnules* 1 inch long, pinnatifid to beyond the middle; lobes ascending, linear, sharp, entire, or with a few sharp teeth. *Sori* very small, near the junction of the lobes. *Rachis* and *stipes* chesnut-brown. *Rhizome* very stout, creeping, densely covered with long, rigid, subulate, often curved scales.—The involucre is sometimes obliquely peltate, and this plant is hence intermediate between *Polystichum* and *Nephrodium.*

4. Polystichum *vestitum*, Presl; frondibus coriaceis bipinnatis (nunc apud proliferis), pinnis lineari-lanceolatis, pinnulis brevi stipitatis oblique ovato-oblongis glabris mucronatis integris crenatis v. argute inciso-dentatis inferioribus nunc basi pinnatifidis, lobulo antico dilatato, stipite rachique villoso paleisque latis castaneis deciduis onusto, rhizomate et basi stipitis squamis magnis densissime tectis.—*Presl, Pterid.* Aspidium vestitum, *Willd. Sp. Pl. Schkuhr, Fil. t.* 43. *A. Rich. Flor. A. Cunn. Prodr.* A. proliferum, *Br. Prodr.* A. pulcherrimum *et* A. Waikarense, *Col. in Tasm. Phil. Journ.* A. venustum, *Homb. et Jacq. Voy. au Pôle Sud, t.* 5. *Fl. Antarct. p.* 107. A. coriaceum β, *Banks et Sol. MSS. An* Polytrichum aculeatum, *Roth.*

Hab. Mountainous parts of the Northern, and throughout the Middle and Southern Islands; common in woods, etc., *Banks and Solander, Colenso, etc.* (Cultivated at Kew.)

This handsome Fern is as variable and as likely to give rise to many discussions, as its equally and similarly variable and very near ally *P. aculeatum* has done in England. It is found commonly in Australia and Tasmania, extra-tropical South America, in many of the Indian Islands, and as far south as Lord Auckland's Group and M'Quarrie's Island. Mr. Brown's *A. proliferum*, founded on a Tasmanian proliferous plant, supposed both by Mr. Brown and myself (see 'Flora Antarctica') to want broad scales, is the same as this; for Mr. Gunn has sent specimens of it equally possessing the scales in a young state, and the *P. vestitum* is often proliferous in New Zealand. In Lord Auckland's Group it becomes subarboreous, having a stout caudex 2–4 feet high.—*Fronds* very numerous, spreading like a crown from a stout rhizome, 1–3 feet high, rigid, coriaceous, linear or ovate-oblong, bipinnate. *Pinnæ* linear-lanceolate, acuminate. *Pinnules* numerous, ovate, oblong, pungent, entire, sharply toothed or almost pinnatifid; the lobes often pungent, shortly stipitate; the lower outer margin produced into a short broad blunt auricle. *Rachis* woolly, and as well as the *stipes* covered with large, ovate-lanceolate, acuminate, membranous scales, that are often lacerated, and are deep brown; those at the base of the stipes of large specimens have a white margin, and are very densely set, an inch long, and curved.

Gen. XVIII. NEPHRODIUM, *Br.*

Sori globosi, dorsales, medio v. ad apicem venularum inserti. *Involucrum* reniforme, sinu affixum.

A large genus of Ferns, natives of both hot and cold climates, chiefly distinguished from *Polystichum* by the involucre being reniform and attached by the sinus, and not orbicular or peltately attached. (Name from νεφρος, *a kidney;* in allusion to the form of the involucre.)

1. Nephrodium *decompositum,* Br.; frondibus glabris puberulis vel pubescentibus ovatis v. deltoideis bi-tri-quadripinnatis membranaceis, pinnulis decurrenti-coadunatis ovato- v. oblongo-lanceolatis inciso-lobatis pinnatifidisve, lobulis dentatis acutis obtusisve, rachibus tenuiter marginatis, stipite gracili basi nudo. —*Br. Prodr.*

Var. *α. glabellum;* frondibus glabratis glaberrimisve.—N. glabellum, *A. Cunn. Prodr.* (Tab. LXXIX.)

Var. *β. pubescens;* frondibus pubescentibus velutinisve.

Hab. Throughout the Northern and Middle Islands, abundant as far south as Banks' Peninsula. (Cultivated at Kew.)

A common and very variable plant, found also in Australia and Tasmania.—*Frond* a span to 3 feet high, ovate, lanceolate, broadly ovate, or deltoid, sometimes pentagonous from the first division of the lowest branch being elongated, tri-quadri-pinnate, rarely pinnate, or bipinnate only, quite smooth, or more or less downy, sometimes covered with resinous glandular points. *Pinnæ* often elongate and even caudate, especially in Tasmania. *Pinnules* small, decurrent, oblong or ovato-lanceolate, pinnatifid, lobed or toothed, divisions very sharp or blunt. *Sori* small, numerous, placed on the middle of a venule. *Involucre* glabrous or hairy. *Rachis* with a very narrow wing or margin, or naked, smooth or pubescent, as is the *stipes,* which is slender, and bears at the curved base a few short chaffy scales.—Plate LXXIX. Fig. 1, 2, under surfaces of pinnules with sori:—*both magnified.*

2. Nephrodium *velutinum,* Hook. fil.; frondibus membranaceis pubescentibus rufo-velutinisve punctis resinosis sæpius conspersis deltoideis bi-quadripinnatis, pinnulis decurrenti-coadunatis lineari-oblongis obtuse pinnatifido-lobatis, lobulis integerrimis crenatisve obtusis, indusiis reniformibus v. nullis pubescentibus pilosis glandulis stipitatis sæpius marginatis, rachi nuda, stipite elongato basi curvo paleis membranaceis elongatis laxe tecto.—Aspidium velutinum, *A. Rich. Flor. A. Cunn. Prodr.* A. pentangularum, *Colenso in Tasm. Phil. Journ.* (Tab. LXXX.)

Hab. Throughout the Islands; frequent in woods.

I have the greatest difficulty in distinguishing many states of *N. decompositum* from this, nor do I know how the line is to be drawn between that species and many forms of this. The present is, in New Zealand, usually a much larger plant, much more universally pubescent and generally covered with a red-brown tomentum; it is more generally tri- or quadri-pinnate, with broader, never sharply-toothed pinnules, and has fimbriate involucres, the edges of which are furnished with obovate club-shaped golden-yellow glands or cells, full of resinous fluid; sometimes however the indusia are wholly absent, and at other times they are reduced to a small scale that is found with difficulty. The scales on the base of the stipes are much longer, more flaccid and membranous in this plant, than in *N. decompositum.* I have examined a very pubescent specimen of *N. decompositum* from Brisbane river, New Holland, with broad pinnules, which I should be inclined to refer to this, but the base of the stipes is wanting.—Plate LXXX. Fig. 1, 2, 3, under surfaces of pinnules; 4, involucres and capsules:—*all magnified.*

3. Nephrodium *squamulosum,* Hook. fil.; fronde glaberrima lanceolata pinnata, pinnis profunde pinnatifidis lineari-oblongis obtusis integerrimis venis furcatis, soris ad angulum venularum v. medio venulæ simplicis insertis, rachi squamulis bullatis sparsis ornata stipiteque glaberrima.—Polypodium invisum, *Forst. Prodr.?* Aspidium squamulosum, *Kaulf. in Sieber, Col. Fil. v.* 1. *n.* 2. Lastrea, *Presl, Pterid.* Aspidium Thelypteris, *var.* squamigerum, *Schlecht. Adumb. p.* 23. *t.* xi.

Hab. Northern Island, *Forster.* Bay of Islands and East Coast, *Colenso.*

This is a South African species, and so closely allied to the English *N. thelypteris,* that I can find no character whereby to distinguish them, except the scattered, deciduous, bullate scales on the young fronds of this. I am far

from satisfied as to its being the *P. invisum* of Forster, a plant which appears from his Prodromus to be a native of New Zealand, but which has been omitted from every succeeding enumeration. Swartz describes *P. invisum* as a native of Jamaica, and Schkuhr quotes both this and New Zealand as its habitats.—*Fronds* a span to 18 inches tall, rising from the top of a prostrate woody rhizome, quite glabrous, lanceolate, pinnate. *Pinnæ* distant, sessile, 1–1½ inch long, acute, deeply pinnatifid; *pinnules* close, ⅓ inch long, linear-oblong, blunt, quite entire; veins forked, the upper simple. *Sori* small, placed at the fork of the lower veins, or at the middle of the upper (as in *N. thelypteris*). *Rachis* and *stipes* perfectly glabrous and shining, when young covered with scattered, membranous, turgid scales.

NOTE. *Aspidium Serra*, Sw. et Willd., a very common tropical Fern, is quoted as a native of New Zealand, on Forster's authority. I find no New Zealand specimens of it in Forster's Herb. (Mus. Brit.), and am very doubtful whether the *A. Serra* of the Prodromus be the plant of Swartz and Willdenow. It is introduced in M. Raoul's catalogue as a native of Akaroa.

Aspidium pennigerum, Swartz, is another plant probably erroneously included in the New Zealand Flora, on the supposition that it is the *Polypodium pennigerum*, Forster, Prodr. The latter is, however, a very different plant, now placed in the genus *Goniopteris*, and Swartz cites Forster as authority for its being a native of New Zealand, and describes it as having an involucre, but quotes Schkuhr's plate, which represents an authentic specimen of Forster's that has no involucre. Sprengel gets over the difficulty by describing the *Goniopteris*, and adding that the involucres are caducous.

Nephrodium molle, Br. Prodr.—This is the *Polypodium molle*, Forster, said to be from New Zealand; but Forster's specimens (Hb. Brit. Mus.) are not so marked, and, though an extremely common tropical and subtropical Fern, I have seen no specimens from these Islands.

Sub-tribe B.—*Sorus naked, neither covered by an involucre, nor by the inflexed margin of the frond.* Gen. XIX. to XXVIII.

Gen. XIX. GONIOPTERIS, *Presl.*

Sori globosi, dorsales, nudi, medio venularum inserti. *Venæ* simplices, inferiores in arcum anastomosantes.

The only species found in New Zealand is a very tall, handsome, glabrous, pinnate Fern, 2–3 feet high, with membranous, linear, acuminate or caudate, pinnatifid (to the middle) pinnæ a span or upwards long, and ⅔ inch broad: lobes or pinnules short, blunt, quite entire.—*Veinlets* in each pinnule free, the lower meeting those of the next pinnule at an angle. *Sori* numerous, without an involucre, placed on the middle of each veinlet, rather nearer the costa than the margin. *Rachis* and *stipes* quite glabrous, smooth and shining, thick but soft, sometimes paleaceous at the base; old specimens acquire a stout, erect, woody caudex, 6–8 inches high, covered with the bases of the old stipes.—This species is found in New Zealand only, others occur in various parts of the Tropics. (Name from γονυ, *an angle;* in allusion to the arched veins.)

1. Goniopteris *pennigera*, J. Sm.; glaberrima, fronde lanceolata pinnata membranacea, pinnis lineari-elongatis acuminatis caudatisve ad medium pinnatifidis, pinnulis obtusis integerrimis, soris versus costam insertis, rachi stipiteque crassiuscula glaberrima nitida.—*J. Sm. Gen. Ferns, p.* 18. Aspidium; *A. Rich. Flor. A. Cunn. Prodr.* Polypodium, *Forst. Prodr. Schk. Fil. t.* 22.

HAB. Northern and Middle Islands: in shady places, as far south as Akaroa, common. Nat. name, "Piu piu" (trembling), *Colenso.* (Cultivated at Kew.)

Gen. XX. POLYPODIUM, *Presl.*

Sori globosi, dorsales, nudi, medio venularum inserti. *Venæ* furcatæ, nunquam anastomosantes.—Frons *pinnatifida v. bi-tripinnata.*

An extensive genus, principally of temperate and tropical Ferns, which may be readily characterized by having round naked sori, placed on the middle of forked free veinlets. *Goniopteris* differs from it in having the lower veinlets united. One of the New Zealand species (*P. rugulosum*) appears to me to pass into *Hypolepis tenuifolia*, the sori sometimes approaching the margin of the lobes, and the latter becoming more or less recurved. The second species is very closely related to *Polystichum vestitum*, and removed from the neighbourhood of that species solely on account of the artificial character of wanting an involucre. The third species differs totally in habit and appearance from either of the above. (Name from *πολυς*, *many*, and *πους*, *a foot*; in allusion to the habit of some Fern to which the name was applied by the ancients.)

1. Polypodium *rugulosum*, Lab.; rhizomate repente, fronde viscido-puberula v. glandulosa bi-quadri-pinnata ovato- v. deltoideo-lanceolata, pinnis lanceolatis acuminatis submembranaceis coriaceisve, pinnulis lineari-oblongis obtusis profunde pinnatifidis, lobis obtusis crenatis, stipite rachique castaneis (rarius pallidis) scaberulis hispidulis asperisve.—*Lab. Fl. Nov. Holl. v. 2. p.* 92. *t.* 241. *Br. Prodr.* P. viscidum, *Spreng. Syst. Veg. v.* 4. *p.* 61. *Flor. Antarct. p.* 110. P. villoso-viscidum, *Petit-Thouars, Fl. Trist. d'Acun.* P. viscosum, *Roxb. in Pritchard, Catalogue of St. Helena Plants.* P. viscidum, *Colenso in Tasm. Phil. Journ.* Cheilanthes ambigua, *A. Rich. Flor.?* C. viscosa, *Carm. Fl. Trist. d'Acun., in Linn. Soc. Trans. v.* 12. *p.* 511.

HAB. Throughout the Islands; common. (Cultivated at Kew.)

Whole plant more or less covered with rufous glandular pubescence; a span to 3 feet high. *Frond* bi-tri-quadri-pinnate, broadly deltoid or ovate-lanceolate, more or less membranous, rarely coriaceous. *Pinnæ* very variable in length, lanceolate, acuminate. *Pinnules* adnate by a broad base, linear-oblong, blunt, deeply pinnatifid; lobes entire or crenate, blunt. *Sori* on the middle of a veinlet. *Stipes* and *rachis* generally dark brown, slender, scabrid, sometimes muricated, often hispid with scattered hairs, rarely glabrous. *Rhizome* rigid, woody, creeping, scaly and hispid, sending up distant fronds.—I have found it quite impossible to give any characters to the numerous varieties of this very common plant: besides being found throughout New Zealand, it inhabits Norfolk Island, Tasmania, and Australia, Auckland and Campbell's Islands, Chili and Fuegia, Juan Fernandez, St. Helena, and Tristan d'Acunha. A very similar (if not the same) plant inhabits the West Indies, Java, and the British East Indies.

2. Polypodium *sylvaticum*, Col.; frondibus coriaceis bipinnatis oblongo- v. elongato-lanceolatis, pinnis lineari-lanceolatis, pinnulis lineari- v. ovato-oblongis breve stipitatis basi cuneatis grosse pinnatifido-lobatis, lobulis argute spinuloso-dentatis, costis nervisque laxe villosis, rachibus stipiteque molliter villosis lanatisve paleisque latis deciduis castaneis pallide marginatis onustis.—*Colenso in Tasm. Phil. Journ.* (TAB. LXXXI.)

HAB. Northern Island; mountainous woods, east coast and interior: Tolaga Bay, etc., *Colenso.* Port Nicholson, *Lyall.*

This approaches so closely to *Polystichum vestitum*, that the absence of any involucre is the only striking technical character whereby it can be distinguished. The nature of the more or less copious, villous, soft, pale-brown hairs on the stipes, rachis, costa, and nerves, and of the large deciduous paleæ, is precisely the same in both; and they further entirely agree in the growth, form, division, and lobing of the frond, its coriaceous texture, colour, and in the position of the sori; in *Polypodium sylvaticum*, however, the pinnules are more stipitate, longer and narrower. In some small mountain specimens the villous hairs are very few, and the paleæ of a very pale colour, and membranous.—PLATE LXXXI. Fig. 1, 2, pinnules; 3, portion of pinnules, showing the position of the sori; 4, capsules; 5, spores:—*all magnified.*

3. Polypodium *Grammitidis*, Br.; fronde glaberrima lineari v. lineari-oblonga profunde decursivo-pinnatifida, pinnis linearibus integris lobato-dentatis v. rarius pinnatifidis, lobis interdum elongatis caudatisve, soris globosis oblongisve.—*Br. Prodr. A. Cunn. Prodr. Fl. Antarct. p.* 111. Grammitis heterophylla, *Lab. Flor. Nov. Holl. v.* 2. *p.* 90. *t.* 239. Xiphopteris heterophylla, *Spreng. Syst. Veg.*

HAB. Abundant on trunks of trees (rarely on wet rocks) throughout the Islands.

Polypodium Grammitidis is also found in Lord Auckland and Campbell's Island, Tasmania, and in Java?—*Roots* fibrous. *Fronds* an inch to a span long, tufted, linear-oblong, ovate or lanceolate, coriaceous, opaque, scaly at the very base of the stipes, perfectly glabrous elsewhere, deeply pinnatifid. *Pinnules* somewhat distant, linear, blunt, decurrent, quite entire, or lobed, or subpinnatifid, often irregularly with one or two lobes lengthened or running out into a tail. *Sori* round or oblong. *Rachis* and short *stipes* winged nearly to the base.—Dwarf states have small linear lobed fronds.

NOTE. *Nephrodium velutinum*, from sometimes wanting an involucre, may be sought for in this genus.

Gen. XXI. PHYMATODES, *Presl.*

Sori in sp. Nov. Zeland. uniseriales, plus minusve fossa frondis immersi, globosi v. oblongi, nudi. *Venæ* furcatæ, omnes anastomosantes, areolis subhexagonis; *venulis* paucis, areolis liberis.—Rhizoma *repens, squamosum.* Frondes *coriaceæ, simplices v. pinnatifidæ.* Stipes *basi articulatus.*

A very abundant tropical genus of Ferns, generally growing on trunks of trees, distinguished by the naked (large) sori partly sunk in a pit of the frond, and the anastomosing veins. One of the New Zealand species is extremely abundant and variable. The fronds are coriaceous, simple or pinnatifid, perfectly glabrous, rising from a stout, creeping rhizome. (Name from φυμα, *a swelling;* in allusion to the thickened base of the articulated frond.)

1. Phymatodes *Billardieri*, Presl; frondibus coriaceis glaberrimis integris pinnatifidisque, pinnis remotis approximatisve anguste linearibus v. late oblongis margine incrassatis, soris subsaccatis solitariis, rhizomate glaucescente crasso subsquamoso.—*Presl, Pterid. Fl. Antarct.* Polypodium, *Br. Brodr. Endl. Prodr. Fl. Ins. Norf. A. Cunn. Prodr.* P. scandens, *Lab. Fl. Nov. Holl. v.* 2. *p.* 91. *t.* 240 (*non Forst.*). P. Phymatodes, *A. Rich. Flor.*

HAB. Throughout the Islands; abundant on rocks and trunks of trees. (Cultivated at Kew.)

A very common and variable plant, also found in Lord Auckland's Island, Tasmania, Australia, and probably the same as some widely diffused species of other parts of the world.—*Rhizome* stout, creeping, generally quite glaucous, partially scaly; sometimes thickly covered with membranous paleæ. *Fronds* numerous, 3 inches to 1½ foot long, coriaceous, perfectly smooth, shining, with a thickened margin; some entire, lanceolate, acute, others broader and pinnatifid; *pinnules* close or distant, narrow-linear or broadly oblong; margins thickened, blunt or acute. *Sori* numerous, large, globose or oblong, partially sunk in the frond. *Costa* very stout and prominent. *Stipes* stout, scarcely winged above, obscurely jointed on to the rhizome.

2. Phymatodes *pustulata*, Presl; frondibus membranaceis glaberrimis aliis anguste lineari-lanceolatis integris aliis lanceolatis profunde decursivo-pinnatifidis, pinnis linearibus apice angustatis obtusis, soris vix saccatis globosis prominulis, rhizomate paleis squarrosis membranaceis obtecto, stipite superne alato v. marginato.—*Presl, Pterid.* Polypodium pustulatum, *Forst. Prodr. Br. Prodr. Schk. Fil. t.* 10. P. acrostichoides, *Forst. Prodr.? A. Rich. Flor.*

HAB. Northern and Middle Islands, as far south as Akaroa; climbing lofty trees. (Cultivated at Kew.)

Very similar to *P. Billardieri* in size, habit, and general appearance, but of a membranous texture, with generally narrower fronds and pinnules, prominent sori, much longer, more flaccid (not glaucous) rhizomes, covered with squarrose paleæ, and more slender, margined or winged stipes. The whole plant is fragrant, and used by the natives to scent their oil and food. It is found in Norfolk Island and East Australia.

Gen. XXII. DICTYMIA, *J. Sm.*

Sori uniseriales, subsaccati v. superficiales, nudi, globosi v. oblongi. *Venæ* anastomosantes, internæ;

venulæ liberæ nullæ. *Capsulæ* pilis articulatis immixtæ.—Rhizoma *validum, repens v. brevissimum.* Frondes *simplices, rhizomate elongato, repente, distantes, v. rhizomate brevissimo, cæspitosæ.*

The simple coriaceous fronds, with internal anastomosing veins, that cannot be seen without maceration and dissection, together with the large, naked, superficial sori, and the capsules mixed with jointed hairs, distinguish *D. lanceolata* from its New Zealand allies.—*Rhizome* very short, covered with broad, imbricate, membranous paleæ; roots brown or black, woolly. *Fronds* perfectly glabrous, tufted, 2–12 inches long, lanceolate, acuminate, narrowed gradually into a short margined stipes, $\frac{1}{2}$–$\frac{3}{4}$ inch broad. *Sori* large, globose, in one series on each side of and near the costa. *Receptacle* sunk in a pit of the frond.—There is a specimen of this plant in Hook. Herb., marked as coming from the Blue Mountains of Australia, but I consider this habitat doubtful. (Name from δικτυον, *a net-work;* in allusion to the reticulated veins.)

1. Dictymia *lanceolata,* J. Sm.; fronde simplici coriacea glaberrima lanceolata acuminata in stipitem brevem gradatim angustata, rhizomate brevissimo squamoso.—*J. Smith in Bot. Mag. v.* 72. *Suppl. p.* 16. Dictyopteris lanceolata, *J. Smith, Genera of Ferns in Hook. Bot. Journ. v.* 4. *p.* 64. D. attenuata, *Hook. et Bauer, Gen. Fil. t.* 71 *B.* Polypodium attenuatum, *A. Rich. Flor.; A. Cunn. Prodr.; Hook. Ic. Plant. t.* 409; *sed non* P. attenuatum, *Brown.*

HAB. Throughout the Northern Island; on trunks of trees, but not common. Akaroa, *Raoul.*

Gen. XXIII. ARTHROPTERIS, *J. Sm. MSS.*

Sori uniseriales, dorsales, globosi, (in sp. Nov. Zel. nudi,) superficiales, venulis terminales. *Venæ* furcatæ, liberæ; venulæ apice incrassatæ, marginem non attingentes.—Rhizoma *repens, squamosum.* Frondes *alternæ, pinnatæ.* Pinnæ *rachi articulatæ.* Stipes *basi articulatus.*

I have adopted this genus from the manuscripts of Mr. Smith, who has kindly given me its characters, and adds that its congeners are the Australian *Nephrodium obliteratum,* Br. Prodr., and *Nephrolepis trichomanoides,* J. Sm., a Luzon Fern. The two latter Ferns have involucres, but in all other respects are considered by Mr. Smith to differ from the genera in which they have been placed, and to form a truly natural genus with the New Zealand *A. tenella.* The latter cannot be associated naturally with any other species of *Polypodium.*—A perfectly glabrous, climbing, pinnate Fern, found also in Eastern Australia.—*Rhizome* very long, slender, rigid, wiry, scaly. *Fronds* scattered, pendulous, jointed above the base, 1–2 feet long, lanceolate, pinnate. *Pinnæ* membranous, alternate, distant, 2–3 inches long, linear-lanceolate (sometimes forked), narrowed to a blunt point, obliquely cuneate at the base, jointed on to the rachis; margin sinuate; costa slender; veins once or twice forked, oblique, all free; veinlets terminating in a swollen point within the margin. *Sori* globose, in one series on each side the costa, near the margin, each placed at the apex of a veinlet. (Name from αρθρος, *a joint,* and πτερις, *a fern;* from the articulate pinnules and stipes.)

1. Arthropteris *tenella,* J. Sm.; frondibus glaberrimis pendulis lineari-lanceolatis pinnatis, pinnis membranaceis alternis lineari-lanceolatis in apicem obtusum angustatis margine sinuatis basi oblique rotundato-cuneatis brevissime stipitatis, soris nudis submarginalibus.—*J. Sm. MSS.* Polypodium tenellum, *Forst. Prodr. Brown, Prodr. Schk. Fil. t.* 16. *Endl. Prodr. Fl. Ins. Norf. A. Cunn. Prodr.* P. marattioides, *Kaulf.* (*fid. Presl*). (TAB. LXXXII.)

HAB. Throughout the Northern Island; common, climbing lofty trees.

PLATE LXXXII. Fig. 1, pinna; 2, portion of the same with sori; 3, capsules:—*all magnified.*

Gen. XXIV. NIPHOBOLUS, *Kaulf.*

Sori multiseriales, dorsales, globosi, nudi, per pubem stellatam protrusi, ad apices venularum liberarum

siti. *Venæ* parallelæ, venulis transversis anastomosantes.—Rhizoma *repens.* Frondes *sæpe biformes, pube stellata obtectæ, simplices.*

A very common tropical genus, with undivided leathery fronds, which are often dissimilar, the fertile being longest and narrowest. The New Zealand species may be readily known by its simple fronds being densely covered on the under surface with white or buff-coloured tomentum, which the microscope shows to be composed of 6–10-rayed stars, placed horizontally on the top of a jointed stalk. It is found in Australia and the Pacific Islands.—*Rhizome* creeping, scaly, slender. *Fronds* scattered, erect, stipitate, barren, obovate or spathulate, blunt, 1½–3 inches long; *fertile* linear-lanceolate, or linear, twice as long as the barren. *Veins* buried in the substance of the frond, parallel, united by transverse venules. *Sori* numerous, chiefly on the upper part of the frond, irregularly placed in several series, large, protruded through the tomentum, each placed at the end of a free venule, which leaves the transverse branches. *Stipes* scaly at the very base. (Name from νιφοβολος, *covered with snow;* in allusion to the copious white scales.)

1. Niphobolus *rupestris,* Spreng.; frondibus coriaceis subtus densissime tomentosis stipitatis erectis sterilibus obovatis spathulatisve obtusis, fertilibus duplo longioribus linearibus obovato-lanceolatis, soris bi-multiseriatis, stipite basi squamoso.—*Spreng. Syst. Veg. Hook. et Grev. Ic. Fil. t.* 93. *A. Cunn. Prodr.* N. bicolor, *Spreng. Syst. Veg. Hook. et Grev. l. c. t.* 44. *A. Cunn. Prodr.* N. serpens, *Endl. Prodr. Fl. Ins. Norf. Presl, Epimel. p.* 129. N. glaber, *Kaulf.* Polypodium rupestre, *Br. Prodr.* P. serpens, *Forst. Prodr.* P. stellatum, *A. Rich. Flor.* P. elæagnifolium, *Bory, in Duperrey Voy. p.* 259. *t.* 31. *f.* 1.

Hab. Abundant on rocks and trees throughout the Islands.

Obs. *Niphobolus glaber,* Kaulf. (*Polypodium acrostichoides,* Forster) is quoted by Richard, with doubt, as a native of New Zealand, from an examination of a plant without fructification, gathered by Captain D'Urville; his description may be taken from a barren specimen of *Phymatodes pustulata.*

Gen. XXV. GRAMMITIS, *Sw.*

Sori medio venulæ affixi, oblongi v. lineares, uniseriales (in Sp. Nov. Zeland.) costæ obliqui, nudi. *Venæ* simplices v. furcatæ, immersæ, liberæ.—Rhizoma *repens, squamosum, breve v. elongatum.* Frondes *cæspitosæ, coriaceæ; venis immersis inconspicuis.*

A small genus of Ferns, of which the New Zealand species is very variable, and found in Tasmania, Australia, Lord Auckland and Campbell's Islands, Fuegia, Lima in Peru, the Sandwich and Falkland Islands, and Tristan d'Acunha.—*Rhizome* creeping, often short, scaly. *Fronds* densely crowded, ¼ inch to a foot long, quite glabrous, rarely pubescent, sometimes pilose or ciliated, erect, very coriaceous, linear-lanceolate or obovate-lanceolate, blunt, or narrowed at the point, quite entire, narrowed into a short winged or margined stipes. *Sori* oblong or linear, oblique, in one series on each side the obscure costa, in small varieties becoming confluent into a mass. *Veins* wholly immersed, forked, free. (Name from γραμμη, *a line;* in allusion to the linear sorus.)

1. Grammitis *Australis,* Br.; rhizomate repente squamoso, frondibus dense cæspitosis erectis linearibus lineari- v. obovato-lanceolatis integerrimis obtusis subacutisve glaberrimis rarius ciliatis hirsutis pilosisve basi in stipitem brevem angustatis, soris linearibus oblongisve (exemplaribus parvis confluentibus).—*Br. Prodr. A. Cunn. Prodr. Flor. Antarct. p.* 111. G. Billardieri, *Willd. Sp. Plant.* G. ciliata, *Col. in Tasm. Phil. Journ.* G. scolopendrina, *Bory, in Duperrey Voy. p.* 257. *t.* 30. *f.* 1. *A. Rich. Flor.*

Var. *β. villosa;* frondibus pubescentibus hirsutisve.

Hab. Throughout the Islands; abundant.

This is an extremely variable Fern, often ciliated with caducous hairs, especially on the stipes. Alpine specimens form dense moss-like patches of small, obovate, coriaceous, blunt fronds ½ inch high, with confluent sori

towards the apex. In dry rocky places again it assumes the form of a very narrow, rigid, wiry frond. The scales on the rhizome also vary extremely in length and colour.

Gen. XXVI. GYMNOGRAMMA, *Desv.*

Sori nudi, lineares, dorso venarum venularumque siti, demum confluentes. *Venæ* furcatæ, liberæ.—Rhizoma *brevissimum v. nullum*. Frondes *cæspitosæ, pinnatæ v. bi-tripinnatæ*.

Principally tropical Ferns, with (rarely simple) pinnate, bi-tri-pinnate, tufted fronds, having no rhizome or a very short one.—*Sori* naked, linear, occupying the veins and venules, hence often running in lines and forking; also covering the spaces between the veins and then becoming confluent. (Name from γυμνος, *naked*, and γραμμη, *a line*; in allusion to the linear sorus, which has no indusium.)

1. Gymnogramma *rutæfolia*, Br.; frondibus cæspitosis erectis pinnatis villosis, pinnis alternis remotis cuneatis flabellatisve inciso-crenatis lobatis dentatisve.—*Hook. et Grev. Ic. Fil. t.* 90. *Hook. Ic. Plant. t.* 935. G. hispanica, *Cosson, in Ann. Sc. Nat. et Notice sur Plantes rares du Midi de l'Espagne*. Grammitis, *Br. Prodr.* Gymnogramma subglandulosa, *Hook. et Grev. Ic. Fil. t.* 9. Pleurosorus rutæfolius *et* P. cuneatus, *Fée, Gen. Fil. p.* 180.

Hab. Northern Island; East Coast, *Colenso*.

This little plant is abundant in extra-tropical Australia and Tasmania, and has also been gathered in the Pyrenees; but I know of no other countries which it inhabits.—*Fronds* densely tufted, 3–5 inches long, villous, often glandular, pinnate; roots of numerous tufted fibres. *Pinnæ* 2–5 lines long, alternate, distant, shortly stipitate, cuneate or flabellate, more or less incised or lobed, rarely quite entire. *Sori* linear, scattered, often confluent.

2. Gymnogramma *leptophylla*, Desv.; tenella, glaberrima, fragilis, frondibus cæspitosis oblongo-lanceolatis bi-tripinnatifidis, pinnis membranaceis obovato-cuneatis bi-trifidis lobatisve, lobis obtusis, costa flexuosa, rachi marginata inferne nuda stipiteque nitida antice sulcata, soris confluentibus.—*Desv. Journ. Bot. Hook. et Grev. Ic. Fil. t.* 25. Grammitis, *Swartz, Syn. Fil.* G. Novæ-Zelandiæ, *Col. in Tasm. Phil. Journ.*

Hab. Dry hills on the East Coast, *Colenso, Sinclair*. (Cultivated at Kew.)

This beautiful little Fern is remarkable for its wide geographical distribution in the northern hemisphere; it inhabits Jersey, the Mediterranean shores and the Atlantic islands, Abyssinia, Mexico, and the Himalaya mountains. In the southern, besides New Zealand, it grows in Tasmania, East and West Australia, and the Cape of Good Hope.—*Fronds* an inch to a span high, perfectly glabrous, membranous and shining, pale green, oblong lanceolate, bi-tri-pinnatifid. *Pinnules* 2–4 lines long, obovate-cuneate, twice or thrice lobed or crenate, the lobes blunt. *Partial* rachis winged. *Stipes* and *main rachis* usually red-brown, brittle, shining, grooved in front.

Gen. XXVII. NOTHOLÆNA, *Br.*

Sorus linearis, continuus v. interruptus, marginatus, nudus v. sub margine pinnulæ inflexo nidulans.—*Venæ* liberæ, pinnatæ v. furcatæ.—Rhizoma *brevissimum*. Frondes *erectæ, rigidæ, cæspitosæ, plerumque farinosæ, squamosæ v. tomentosæ, pinnatæ v. bi-tri-pinnatæ*.

A tropical and subtropical genus, of which the only New Zealand species is also a native of Australia and New Caledonia. This very closely resembles *Cheilanthes tenuifolia*, but may be readily distinguished by its scaly and tomentose frond, and by the confluent sori not being covered by any special involucre.—*Fronds* of *N. distans* densely tufted, arising from a very short rhizome, 3–10 inches high, rigid, wiry, erect, scaly with long pale scales, linear, bipinnate, or pinnate, with the pinnæ pinnatifid. *Primary pinnæ* distant, deltoid, shortly stipitate, hirsute below with pale shaggy scales, pubescent or naked above; pinnules short, oblong. *Rachis* and slender stipes

grooved, setose with soft scale-like hairs. *Roots* fibrous, densely matted. (Name from *νοθος, spurious*, and *læna* (*χλαινα*), *a cloak;* from the false involucre formed of the margin of the frond.)

1. Notholæna *distans,* Br.; frondibus squamoso-hirsutis dense cæspitosis rigidis pinnatis, pinnis brevibus distantibus oppositis deltoideis breve stipitatis lobatis pinnatifidisve, pinnulis oblongis.—*Br. Prodr. Lab. Sert. Aust. Caled. v.* 5. *t.* 8. *Hook. Ic. Plant. t.* 980.

HAB. Northern Island, on exposed basalt rocks: Bay of Islands, East Coast, Cape Kidnapper, etc., *Colenso, Sinclair, etc.* (Cultivated at Kew.)

Gen. XXVIII. STENOCHLÆNA, *J. Sm.*

Frondes biformes. *Sorus* superficialis, continuus, paginam totam frondis fertilis contractæ obtegens, nudus v. margine frondis tenuiter recurvo obtectus. *Venæ* simplices v. furcatæ; venulis parallelis, marginem pinnæ attingentibus.—Rhizoma *alte scandens.* Frondes *alternæ, pinnatæ, nunc polymorphæ,* stipite *cum rachi continuo.* Pinnæ *breviter stipitatæ, rachi articulatæ, steriles serrulatæ;* fertiles *contractæ, sæpius lineares v. filiformes.*

A remarkable genus, chiefly of tropical scandent Ferns; the species resemble *Lomaria* in fructification, but have no true involucre. Several species, and the New Zealand one especially, bear fronds of very different forms on different parts of the same plant. *L. heteromorpha* climbs lofty trees by means of a stout woody rhizome, as thick as the finger, and covered with squarrose chaffy hairs.—*Fronds* pendulous, 6 inches to 2 feet long, alternate, pinnate, not jointed on to the rhizome. *Pinnæ,* in many pairs, jointed on the rachis, in young plants and the lower parts of old ones oblong or rounded, blunt, deeply and coarsely crenate or serrate, 3 lines to an inch long, membranous, rounded at the base, stipitate; upper fronds linear-lanceolate, pinnæ glabrous, coriaceous, linear-lanceolate, falcate, 2–3 inches long, $\frac{1}{3}$–$\frac{1}{2}$ inch broad, finely crenulate or serrate, tapered from the base to a long serrate point, truncate or cordate, obscurely auricled at the base, shortly stipitate; lowermost pinnæ smaller, often orbicular, truncate at the base. *Costa* stout; veins forked, free, parallel. *Stipes* rigid, often paleaceous, deeply grooved on the upper surface. *Fertile pinnæ* on separate fronds, or on the upper part of barren ones, filiform. (Name from *στενος, narrow,* and *χλαινα, a cloak;* from the narrow, spurious involucre.)

1. Stenochlæna *heteromorpha,* J. Sm.; frondibus pinnatis, pinnis stipitatis junioribus parvis membranaceis oblongis rotundatisve grosse crenato-serratis, senioribus coriaceis e basi truncata cordata subauriculata elongato-lanceolatis gradatim in apicem longe acuminatum angustatis serrulatis, pinnis fertilibus filiformibus, stipite paleaceo v. glabrato, rhizomate valido alte scandente paleis squarrosis subhirsuto.—*J. Sm. in Hook. Bot. Journ. v.* 4. *p.* 149. Lomaria filiformis *et* L. propinqua, *A. Cunn. Prodr.* L. pimpinellæfolia, *Nob. in Hook. Lond. Journ. Bot. v.* 3. *p.* 412. Osmunda reptans, *Banks et Sol. MSS.*—Variat pinnulis apice basique proliferis lobatis.

HAB. Northern and Middle Islands, as far south as Banks' Peninsula. (Cultivated at Kew.)

Tribe V. SCHIZÆEÆ.—*Sori arranged in imbricated spikes, or on resupinate divisions of the frond. Capsules sessile, striated at the apex (the horizontal ring being terminal).* Gen. XXIX., XXX.

Gen. XXIX. LYGODIUM, *Sw.*

Indusia biseriata, in spiculas dorso frondis mutatæ adnatas imbricata, superne libera. *Sporangia* quovis indusio solitaria, sessilia, ovoidea, resupinata, reticulata, apice striata, latere inserta.—Frondes *glaberrimæ, alte scandentes.* Pinnæ *conjugatæ, divisæ v. compositæ.*

A very remarkable genus of climbing Ferns, with very slender wiry stems, found in all tropical countries.

L. articulatum is only found in New Zealand and Norfolk Island; it forms in the forest impervious screens of tough wire-like stems, that are used as cordage, and ascend trees 50–100 feet high: they are knotted and shining.—*Fronds* perfectly glabrous, dichotomously palmatipartite. *Pinnæ* divaricating, articulate at the base, linear or linear-oblong, blunt or sharp, waved or obscurely crenate, 1–4 inches long, cuneate at the base, costa slender; veins forked, free. *Fertile fronds* repeatedly dichotomously branched, the stalks of the pinnules often divided much, regularly divaricating. *Pinnules* 2–3 lines long, wedge- or fan-shaped, lobed; lobes short, small, bearing on the under surface towards their ends an adnate spikelet, formed of alternating imbricating scales or indusia. Each *indusium* has within it an ovoid capsule, which is attached by its side to a venule of the frond, and points downwards and inwards; surface reticulated, apex striated. *Spores* bluntly three-angled. The *rhizome* of young plants is creeping, slender, rigid, wiry, branched, densely covered with shining, dark-brown, paleaceous hairs. *Stipes* angular, not jointed into the rhizome. (Name from λυγος, *a liana*, and ειδος, *resembling*.)

1. Lygodium *articulatum*, A. Rich.; glaberrimum, frondibus palmatim dichotome divisis, pinnulis cum rachi gracili stricta articulatis lineari-lanceolatis oblongisve integris subacutis, venis liberis furcatis, frondibus fertilibus repetitim dichotome palmatim divisis, rachibus filiformibus dichotomis, pinnulis parvis flabellatis cuneatisve varie lobatis, spiculis brevibus.—*A. Rich. Flor. p.* 96. *t.* 15. *A. Cunn. Prodr.*

HAB. Throughout the Northern Island, common. Nat. name, "Mange-mange," *Col.* (Cultivated in England.)

Gen. XXX. SCHIZÆA, *Sm.*

Sporangia ovoidea, basi inserta, reticulata, apice striata, secus lacinias lineares incurvas frondis resupinatæ biseriatim inserta. *Indusium* nullum v. e margine laciniarum inflexo formatum.—Rhizoma *repens, breve, squamosum.* Frondes *cæspitosæ, erectæ, simplices, dichotome ramosæ, filiformes, sulcatæ, sæpius cristam terminalem profunde pinnatifidam gerentes; pinnis linearibus, conniventibus, pagina superiore soriferis.*

A very curious genus, rare in the north temperate zone, common in the south temperate and tropics; all the New Zealand species are widely diffused plants. The species have erect, generally simple, sometimes dichotomously or flabellately branched, linear, flattened or filiform fronds, which bear at their apices a small inclined pinnatifid limb or comb, upon whose divisions the capsules are arranged. *Capsules* in two series, close together on each side the costa of each division, partially covered by the incurved margin, ovoid, sessile by the broad end, reticulated, striated at the smaller end, bursting laterally. *Spores* with rounded angles.—The fructification deceptively appears borne on the upper surface of the frond in this genus, the upper portion of the latter being resupinate; the groove however of the stipes, which indicates the true upper surface, will be found on the opposite side from the capsules. (Name from σχιζω, *to divide*; from the split frond.)

1. Schizæa *bifida*, Sw.; frondibus simplicibus dichotomisve asperulis subsemiteretibus, pinnis 8–16-jugis margine lacero-crinitis.—*Sw. Fil. p.* 157. *Br. Prodr. A. Rich. Flor. A. Cunn. Prodr. Schnizlein, Icon. t.* 29. S. propinqua, *A. Cunn. Prodr.*

HAB. Northern Island, and north parts of the Middle Island, *D' Urville, Cunningham, etc.*

A very widely distributed plant, found in Australia and Tasmania, the East Indian Islands, Cape of Good Hope, and in Guiana.—*Rhizome* short, stout, subterranean, thickly covered with red-brown paleaceous hairs. *Fronds* numerous, tufted, wiry, erect, rough to the touch, a few inches to $1\frac{1}{2}$ foot long, simple or once branched, semi-terete, grooved on one side. Comb or appendix reclined, of eight to ten pairs of pinnæ, with laciniate crinite edges. —The *S. australis* of Auckland Island seems to be a small variety of this species.

2. Schizæa *dichotoma*, Sw.; fronde basi simplici compressa lævi v. aspera superne pluries dichotome ramosa, laciniis planis submembranaceis costatis anguste linearibus, appendice parva lata brevi suberecta, pinnis 6–10 margine crinitis.—*Swartz, Syn. Fil. Br. Prodr. A. Cunn. Prodr. Hook. et Grev. Ic. Fil. t.* 17.

HAB. Northern Island: Bay of Islands, *Cunningham, etc.* Manakau Bay, *Colenso.*

A common Fern in various parts of the world, as Australia, the Pacific, East Indian, and Malay Islands, Madagascar, Bourbon, etc.—*Fronds* a span to 2 feet high, simple below, stout and rigid, dichotomously divided above into numerous narrow, linear, flat, strap-shaped, costate segments, that are spread out like a fan. *Appendix* 2–3 lines long, broad and short, of four to eight pairs of pinnæ, with crinite margins.

Tribe VI. Osmundeæ.—*Sori naked. Capsules stalked, with a broad, dorsal, incomplete ring bursting vertically.* Gen. XXXI.

Gen. XXXI. LEPTOPTERIS, *Presl.*

Capsulæ pedicellatæ, subglobosæ, secus venulas dorso frondis sparsæ, reticulatæ, gibbosæ, gibbere dorsali uno latere striato. *Venæ* furcatæ, liberæ.—Rhizoma *crassum, repens.* Frondes *erectæ, bi-tripinnatæ, pellucidæ.*

Both the New Zealand species of this genus are amongst the most beautiful Ferns of these Islands, to which they are quite peculiar, and their only near ally is the Australian *L. Frazeri.*—*Rhizome* stout. *Fronds* erect, bi-tri-pinnate, deep green, translucent, membranous, crisp. *Pinnules* very small, cut into many linear lobes; veins forked, free. *Capsules* scattered over the back of the frond, placed on the veins, pedicelled, reticulated, except at a protuberant part, which is striated on one side. *Spores* depressed, with a dark spot. (Name from λεπτος, *membranous,* and πτερις, *a fern.*)

1. Leptopteris *hymenophylloides,* Presl; fronde deltoideo-ovata v. lanceolata, pinnis lineari-lanceolatis acuminatis, pinnulis lineari-oblongis breviter stipitatis pinnatifidis, segmentis bi-trifidis, rachi stipiteque floccoso-tomentosa v. glaberrima.—Todea, *Presl, Suppl. Pterid. p.* 71. *A. Rich. Flor. p.* 97. *t.* 16. *Hook. et Bauer, Gen. Fil. t.* 46 *B.* T. pellucida, *Carm. in Hook. Bot. Misc. A. Cunn. Prodr. Hook. Ic. Plant. t.* 8.

Hab. Northern and Middle Islands, as far south as Banks' Peninsula. Nat. name, "Heru-heru," *Colenso.*

Fronds 4 inches to 2½ feet high, springing from a stout, erect, caulescent rhizome, deltoid-ovate or lanceolate, the lower primary pinnæ not becoming gradually smaller. *Pinnæ* linear-lanceolate, acuminate. *Pinnules* very numerous, shortly stipitate, oblong, blunt, deeply pinnatifid; divisions narrow, generally once or twice forked. *Stipes* and *rachis* stout, more or less covered with floccose red-brown wool.

2. Leptopteris *superba,* Hook.; fronde lanceolata basi angustata, pinnis inferioribus gradatim minoribus deflexis, pinnis linearibus acuminatis, pinnulis ovatis inferioribus rachi appressis profunde pinnatifidis, segmentis subintegris, rachi stipiteque crasso valido subfloccoso, caudice erecto.—*Hook. Ic. Pl. t.* 910. Todea, *Col. in Tasm. Phil. Journ.*

Hab. Mountains of the east, south, and interior parts of the Northern Island, and throughout the Middle and Southern Islands, *Banks and Solander, Colenso, Lyall, etc.*

A truly magnificent Fern, similar in many respects to *T. hymenophylloides,* but readily distinguished by its greater size, lanceolate fronds, deflexed lower pinnæ, which become gradually smaller, narrower pinnæ, ovate often crisped pinnules, the lower of which are appressed to and cover the surface of the rachis, and by the more simple lobules. The caudex is short, erect, and crowned with a circle of the deep green fronds.

Obs. I have a specimen of *Todea Africana,* Willd., from Dr. Sinclair, stated to have been gathered near Auckland, but I am uncertain as to its being indigenous to New Zealand, being far from a local plant in other countries where it is found, as in Australia, the Cape of Good Hope, etc. It is readily distinguished from *Leptopteris* by having coriaceous fronds.

Tribe VII. Marattieæ.—*Sori dorsal. Capsules coriaceous, without a ring, more or less combined into an oblong or linear lobed mass (sorus), which bursts along its whole length.* Gen. XXXII.

Gen. XXXII. MARATTIA, *Sm.*

Sori oblongi, serie intramarginali dispositi, venulis simplicibus furcatisque liberis siti. *Capsulæ* in sorum bivalvem seu billamellatum coadunatæ; valvæ intus planæ, pluriloculares, rimis transversis dehiscentes. *Sporæ* minutissimæ. *Indusium* lineare, angustum, fimbriatum, venulæ longitudinaliter adnatum.—Rhizoma *crassum, coriaceo-carnosum.* Frondes *rhizomate articulatæ, stipite basi dilatato, bi-multipinnatæ; pinnulis serratis.*

A genus of tropical Ferns, also found in subtropical regions of the southern hemisphere, consisting of but few species, the numbers of which have been greatly exaggerated by modern authors. The only New Zealand species is found in Norfolk Island, the New Hebrides, Pacific and Malay Islands, Ceylon, Bourbon, the Cape of Good Hope, and South America.—*Rhizome* a rounded, hard, fleshy mass (roasted and eaten by the natives), as large as the head, from which many tall fronds arise. *Stipes* stout, green, jointed on to the rhizome, dilated into stipules at the base. Mr. Colenso says that the frond is mobile at the joints, which is not the character of cultivated specimens of this or of any other species of the genus. *Fronds* coriaceous, dark green, deltoid, bi-tri-pinnate, 10–18 feet high. *Pinnules* sessile or shortly stipitate, jointed to the rachis, lanceolate or linear-oblong, acuminate, 3–7 inches long, rounded at the base, serrate. *Costa* stout, glabrous or slightly hairy; veins free, parallel, simple or forked. *Sori* of very curious structure, placed at the ends of the veins just within the margin; each consists of two opposite parallel plates with convex backs and plane faces, the latter marked by transverse gashes opening into as many cells, which contain the spores; structurally each sorus is composed of two rows of capsules laterally united into a many-celled body. *Spores* elliptical, very minute indeed. *Sorus* surrounded at the base by a narrow fimbriated indusium. (Named in honour of *Jean F. Maratti*, Abbé of Vallombreuse, who devoted his attention to Ferns.)

1. Marattia *salicina*, Sm.; pinnis lineari-oblongis lanceolatisve acuminatis serratis basi rotundatis sessilibus v. breve stipitatis.—*Smith in Rees' Cyclop. De Vriese et Harting, Monog. Maratt. p.* 5. M. elegans, *Endl. Prodr. Fl. Ins. Norf.*

Hab. Northern and eastern parts of the Northern Island, *Cunningham, Edgerley, Colenso, Sinclair.* Nat. name, "Para," *Col.* (Cultivated at Kew.)

Note. *Angiopteris evecta*, Hoffm.—I find a specimen of this plant in the Hookerian Herbarium stated to be a native of New Zealand, but upon insufficient authority: it is named *A. aurata* by M. De Vriese, in that author's monograph of *Marattiaceæ*, and is probably from Ceylon, where I find specimens possessing the characters upon which he founds the species *aurata*.

Tribe VIII. Ophioglosseæ.—*Sori in stalked spikes or panicles. Capsules sessile, without a ring, globose, coriaceous, bursting transversely into two valves.* Gen. XXXIII., XXXIV.

Gen. XXXIII. OPHIOGLOSSUM, *L.*

Capsulæ sessiles, globosæ, in spicam elongatam distiche biseriatim coadunatæ, coriaceæ, rima transversa dehiscentes. *Sporæ* minutissimæ, globoso-trigonæ.—Radix *e fibris carnosis.* Frons *simplex, erecta,* folium *solitarium* (*rarius* 2) *simplex reticulatim nervosum gerens, in spicam elongatam pedunculatam desinens.*

A very curious genus, found in almost all latitudes to which Ferns extend. Upwards of thirty species have been made of it, many of which do not differ even as varieties from the common *O. vulgatum* of Europe, and most of them may, I think, be referred safely to that plant. Such is the opinion which has been arrived at by Mr. J. Smith and myself quite independently. The genus affords one of the most striking examples of the proneness of many botanists to make species on insufficient grounds, and of the fallacy that prevails with regard to

species being confined within narrow limits. I confidently affirm, that were I to show the authors of many of the so-called species of *Ophioglossum* preserved in the Hookerian Herbarium, their own specimens, named by themselves, and substitute "Britain" on their tickets for the distant countries from which they were brought, these authors would unhesitatingly pronounce their plants to be *O. vulgatum*. As to the book characters of the species, some are founded on erroneous observations, others are drawn from exceptional varieties or forms, and not a few present only differences of words and not of meaning. Some of the minute and narrow coriaceous-fronded specimens look very different from the larger ones with broad cordate fronds, but these are differences generally induced by locality, elevation, etc., and such differences are not constant in any locality.—*Root* of long fleshy fibres, sometimes descending from a thickened base of the frond or tuberous rhizome. *Frond* simple, erect, 1 inch to a foot long, bearing one (rarely two) coriaceous, simple, linear, or lanceolate or ovate, opaque or translucent leaf, with reticulate venation. *Fructification* a long flattened spike, which is shorter or longer than the leaf, and consists of two opposite rows, each of six to thirty globose capsules, cohering together, and to a central axis, each bursting transversely. *Spores* very minute, rounded, and trigonous. (Name from οφις, *a serpent*, and γλωσσα, *a tongue*.)

1. Ophioglossum *vulgatum*, Linn.

Var. β. *costatum;* fronde ovata v. lanceolata reticulatim venosa costata v. ecostata.—O. costatum, *Br. Prodr.* O. elongatum, *R. Cunn. in A. Cunn. Prodr.*

Var. γ. *gramineum;* fronde ovata v. lanceolata acuta ecostata enervi.—O. gramineum, *Willd. Br. Prodr.*

Var. δ. *Lusitanicum;* fronde lineari-lanceolata v. lineari-oblonga enervi ecostata.—O. Lusitanicum, *Auct.* O. coriaceum, *A. Cunn. Prodr.*

Var. ε. *minimum;* parvulum, 1–2-unciale, fronde rhombeo-ovata v. oblonga acuta.

Hab. Common throughout the Islands, in grassy places, *Cunningham, etc.* (A native of England.)

Gen. XXXIV. BOTRYCHIUM, *L.*

Capsulæ globosæ, sessiles, distinctæ, in spicam di-trichotome divisam biseriatim dispositæ, transverse dehiscentes. *Sporæ* trilobatæ.—Radix *subtuberosa, fibris crassis.* Frons *herbacea, pinnatim v. bi-tripinnatim divisa;* venis *pinnatis, radiatisve, simplicibus v. furcatis.* Spica *pedunculata;* pedunculo *e basi frondis orto.*

A genus of few (perhaps only two) species, found in various temperate and tropical countries. *B. Virginicum*, the only New Zealand one, is also found in Australia, Tasmania, the Himalaya mountains, in North and South America, and, what is very remarkable, occasionally in Norway, but nowhere else in Europe, nor in Asia north of the Himalayas. The succulent fronds are cooked and eaten in New Zealand and India.—*Root* of very thick, fleshy fibres. *Frond* solitary, 3 inches to 2 feet high, very coriaceous and thick, consisting of one tripinnate or ternately decompound stipitate leaf, and a long, erect peduncle, bearing a deltoid or ovate trichotomously branched spike of capsules, with unilateral ascending branches. *Pinnules* lobed and crenate, blunt, obscurely veined; *costa, stipes,* and *rachis* glabrous or pubescent or woolly. *Capsules* globose, separate from one another, distichously arranged on the branches of the spike, each bursting transversely. *Spores* very minute, three-lobed or of three connate spheres. (Name from βοτρυς, *a cluster;* from the branched clusters of capsules.)

1. Botrychium *Virginicum*, L.; glabra v. pubescens, scapo subradicali, fronde trichotome divisa, segmentis bipinnatifidis lobatis crenatisque.—*Br. Prodr. A. Cunn. Prodr.* Osmunda ternata, *Thunb. Jap. p.* 329. *t.* 32.

Hab. Northern and Middle Islands, as far south as Canterbury, *Banks and Solander, etc.* Nat. name, "Patotara," *Col.*

Obs. The English *B. Lunaria*, having been found in Fuegia and Tasmania, probably exists in New Zealand also; it may be recognized by its simple pinnate frond, with rhomboid or lunate, crenate, radiately veined pinnæ.

NAT. ORD. XCVI. LYCOPODIACEÆ, *DC.*

Gen. I. PHYLLOGLOSSUM, *Kunze.*

Capsulæ in spicam bracteatam pedunculatam dispositæ, axillis bractearum sessiles, reniformes, 2-loculares, 2-valvæ, rima verticali transverse dehiscentes, sporis minutissimis trigonis farctæ.—Folia *omnia radicalia, pauca lineari-subulata, teretia.* Radix *tuberosa; tuberibus didymis,* Orchideis *referentibus.*

A very remarkable plant, discovered almost contemporaneously by M. Priess at Swan River, Mr. Gunn in Tasmania, and by myself in New Zealand, where it has since been gathered by various collectors.—Whole plant quite glabrous, rather fleshy, 1–3 inches high.—*Root* of two ovoid tubers, quite like that of an *Orchis,* with long simple fibres from the crown. *Leaves* few, terete, subulate, grass-green, erect, rising from the tubers of the present year. *Stem, scape* or *peduncle,* solitary, erect, terete, rising from among the leaves, bearing a small terete spike of imbricating trigonous pedicelled scales. *Capsules,* like those of *Lycopodium,* placed in the axils of the scales. (Name from φυλλον, *a leaf,* and γλωσσα, *a tongue.*)

1. Phylloglossum *Drummondii, Kunze in Bot. Zeit. p.* 724. *cum Ic. xylog. Hook. Ic. Plant. t.* 908. Lycopodium Sanguisorba, *Spring, Monog. Lycop. pt.* 2. *p.* 36.

HAB. Northern Island; Bay of Islands and Auckland, *Sinclair, Colenso, etc.*

Gen. II. TMESIPTERIS, *Bernh.*

Capsulæ ad axillam folii furcati sessiles, oblongæ, coriaceæ, bilobæ, lobis divaricatis subacutis, bivalves, rima verticali dehiscentes. *Sporæ* minutissimæ, oblongæ, curvæ.—Frons *pendula, coriacea, foliosa.* Stipes *angulatus.* Folia *alterna, verticalia, fertilia biloba* (*seu didyma*), *plana, costata, enervia, obtusa, mucronata, basi decurrentia.*

A remarkable genus, containing only one species, which inhabits New Ireland, New Zealand, Norfolk Island, Australia, Tasmania, the Pacific Islands, and California, often in the former countries growing epiphytically on Tree-ferns.—*Fronds* leafy, pendulous, flaccid, elongated, simple or dichotomously branched, 6 inches to 2 feet long. *Stipes* angled. *Leaves* vertical, decurrent, oblong or ensiform, sessile by a broad base, acuminate, blunt or truncate and retuse, with an exserted costa, opaque, coriaceous, ½–1 inch long. *Fertile pinnæ* didymous, stipitate. *Capsule* large, oblong, two-lobed, the lobes divaricating, splitting into two valves through both lobes, placed at the forking of a pinnule. *Spores* very minute, oblong, curved.—Two species have been made of this plant, one for the truncate-leaved, and the other for the acuminate-leaved, but both forms may be found on one specimen. (Name from τμησις, *a notch,* and πτερις, *a fern;* from the split pinnules.)

1. Tmesipteris *Forsteri, Endl. Prodr. Fl. Ins. Norf. A. Cunn. Prodr. Monog. Lycopod. p.* 265. T. Tannensis, *Lab. Fl. Nov. Holl. v.* 2. *p.* 105. *t.* 252. *Bernh. in Schrad. Journ.* 1801. *p.* 131. *t.* 2. *f.* 5. Psilotum truncatum, *Br. Prodr.* T. Billardieri, *Spring, Monog. l. c.*

HAB. Throughout the Islands, abundant.

Gen. III. LYCOPODIUM, *L.*

Capsulæ sessiles, axillares, uniloculares: aliæ reniformes, rima longitudinali dehiscentes, bivalves, sporis minutissimis trigonis linea tricruri notatis repletæ; aliæ 2-3-lobæ, 2–3-valves, corpusculis 1–6 farctæ. *Frondes* coriaceæ, plerumque foliosæ, erectæ, volubiles v. pendulæ.—Capsulæ *in spicam imbricatam dispositæ v. foliis axillares.*

A very large genus, whose species are generally very widely diffused, several being found in most climates and and latitudes. The genus has been monographed by M. Spring in the 15th and 24th volumes of the Memoirs of the Brussels Academy.—*Fronds* erect from a creeping rhizome, climbing or pendulous, leafy. *Leaves* small, distichous, trifarious, quadrifarious, or imbricated. *Capsules* in sessile or peduncled, terete, angled, or square spikes, or sessile in the axils of the leaves, often of two kinds: the most usual are kidney-shaped, sessile, one-celled, bursting longitudinally all round, and full of minute trigonous spores, each marked with three diverging lines; other capsules are two- or three-lobed, two- or three-valved, and contain one to six large spores. (Name from λυκος, *a wolf*, and πους, *a foot;* from some fancied resemblance.)

§ a. Selago.—*Leaves imbricated all round the stem. Capsules axillary in the upper leaves or in the bracts of terminal sessile quadrifarious spikes.*

1. Lycopodium *Selago,* L.; erectum v. basi decumbens, caulibus cæspitosis ramosis strictis brevibus subcylindraceis obtusis (nunc proliferis), foliis parvis arcte imbricatis erectis (rarius squarroso-patentibus) subulato-lanceolatis acuminatis acutisve, capsulis axillaribus.—*Linn. Sp. Pl. Engl. Bot. t.* 233. *Fl. Antarct. p.* 394. *Spring, Monog. p.* 19.

Hab. Middle Island, mountains near Nelson, *Bidwill.* (A native of England.)

This is a very widely diffused plant, always growing in moorlands or open boggy grounds, often on mountains: it has been found in the southern hemisphere on the Tasmanian mountains, Falkland Islands, and Tristan d'Acunha; it abounds in the North Temperate and Arctic zones, and is found on the Andes. New Zealand specimens differ in no particular from European.—*Stems* stout, rigid, tufted, branched or simple, often decumbent at the base, erect, cylindrical, 4–8 inches high, blunt, $\frac{1}{4}$–$\frac{1}{3}$ inch diameter. *Leaves* closely imbricated up and round the whole stem, rarely spreading, broadly subulate or lanceolate-subulate, acute or acuminate, 2 lines long. *Capsules* sessile amongst the upper leaves.

2. Lycopodium *varium,* Br.; caule robusto ramoso basi decumbente dein erecto folioso, foliis decurrentibus linearibus obtusis acutisve arcte imbricatis squarroso-patentibusve, spicis robustis cernuis simplicibus v. parce dichotome ramosis, squamis brevibus obtusis rariusve foliaceis.—*Br. Prodr. Spring, Monog. p.* 57. *et pt.* 2. *p.* 24. *Fl. Antarct. p.* 115. *Hook. et Grev. Ic. Fil. t.* 112.

Hab. Mountainous parts of the Northern Island: Mount Egmont, *Dieffenbach.* Waikati, *Sinclair.* Tararua, *Colenso.* Southern Island: Foveaux Straits, *Lyall.*

A common plant in Auckland Island, also found in the South Sea Islands, in South Africa, and Tasmania, in which latter locality several varieties occur: of these, one with weaker stems passes into the following, and another, with shorter, smaller, more subulate leaves and axillary capsules, passes into *L. Selago.* In the 'Flora Antarctica' I have hazarded the opinion, that this, the following, and very many other species of the *Selago* group, are mere varieties of *L. Selago* itself, strangely altered by locality and climate. This is not however the opinion of M. Spring, of Brussels, the author of two elaborate and valuable essays on this genus, in which the extraordinary number of 107 species of *Lycopodium* and 209 of *Selaginella* are enumerated. M. Spring published his first essay prior to, and the second after an examination of the Hookerian Herbarium, and the result of that examination seems to have been subversive of some of these species, and the introduction of some very perplexing synonymy amongst others. The Auckland Island specimens of the present plant, for instance, are named in Hook. Herb. *L. sulcinervium,* as are some New Zealand specimens of this and of some of the following species. The name of *L. varium* again is retained to some of the Van Diemen's Land specimens, whilst that of *sulcinervium* is given to others, which were gathered by myself at the same island and place; and the Tasmanian specimens of *Selago* are in part so called, and in part referred to *L. sulcinervium.* The name *sulcinervium* was apparently adopted in M. Spring's first essay, and appears to be a synonym of *L. varium,* a plant then unknown to M. Spring.

In its ordinary state *L. varium* may be recognized by its stout, erect stem (6–18 inches high) and branches, patent or generally imbricated, decurrent, linear, coriaceous, blunt leaves, and stout, drooping, tetragonous spikes

of capsules, with short, ovate, keeled, blunt, imbricating scales: these scales however often become foliaceous (in var. *umbrosum*, Br.), when the spicate character is lost. When the leaves become more subulate and smaller, the plant appears to pass into *L. Selago*. When it inhabits warmer latitudes it grows dependent from trees, is much branched, more slender and flaccid, and becomes *L. Billardieri*. I cannot distinguish this species from the *L. gnidioides* of South Africa and the Mauritius, by any character of importance.

3. Lycopodium *Billardieri*, Spring; caule elongato pendulo ramoso, foliis sparsis decurrentibus ligulatis acutis, spicis gracilibus tetragonis dichotome ramosis, capsulis rarius in apices ramulorum foliosis dispositis.—*Spring, Monog. p.* 56. L. flagellaria, *A. Rich. Flor., non Bory* (*fid. Spring*). *A. Cunn. Prodr.* L. laxum, *Presl* (*fid. Hook. Bot. Misc. v.* 3. *p.* 105).

Hab. Northern and Middle Islands, abundant, as far south as Otago, pendulous from trees.

Richard considered this the same with a plant found in New Guinea (by Labillardière), and described and figured by Bory; the latter M. Spring reduces to *L. carinatum*, Desv., and makes of the New Zealand a new species (*L. Billardieri*). I am not acquainted with Bory's plant, but cannot help suspecting that this is probably a variety of the preceding, and of *L. gnidioides* of South Africa, *L. varium* of Otaheite (Menzies in Hook. Herb.), and *L. myrtifolium*, Menz., of Owhyhee, both which latter have however been referred to *L. sulcinervium* by M. Spring. —*Roots* tufted. *Stems* pendulous, very long (2–4 feet), slender, rigid, cylindric, grooved, flexuous, with flaccid branches. *Leaves* rather scattered below, more approximate above, decurrent, suberect, linear or ligulate, acute or blunt, nerveless, or the lower with a strong costa and longitudinal depression on either side of it, lower $\frac{3}{4}$, upper $\frac{1}{4}$ inch long; the latter often subulate, keeled, erect, appressed, and closely imbricate. *Spikes* $\frac{1}{4}$–4 inches long, simple or dichotomously branched, tetragonous. *Scales* broadly ovate, coriaceous, keeled, closely imbricate, half concealing the capsules: more rarely the capsules are axillary in the leaves at the end of the branches; at other times the spikes have leaf-like scales: young specimens have patent, more flaccid leaves, with thickened margins.—I have gathered all states of this plant growing together. The figure of *L. varium* (in Hook. Ic. Fil. t. 112) is taken from a specimen of this gathered in Otaheite, according to Menzies' ticket, but I suspect some mistake about the habitat; it is identical with New Zealand specimens of *L. Billardieri*.

§ b. *Leaves imbricated all round the stem. Spikes cylindrical, sessile.*

4. Lycopodium *densum*, Lab.; caule erecto superne fastigiatim ramosissimo, foliis sex-multi-fariam imbricatis erectis et appressis v. patulis et squarrosis subulato-lanceolatis integris longe acuminatis piliferisve, spicis terminalibus solitariis sessilibus ramulis latioribus oblongo-cylindraceis squarrosis, squamis scariosis triangulari-ovatis, sporis hispidis.—*Lab. Fl. Nov. Holl. v.* 2. *p.* 104. *t.* 251. *f.* 1. *Br. Prodr. A. Cunn. Prodr. Spring, Monog. p.* 87.

Hab. Throughout the Northern Island, abundant on dry fern-lands; Chatham Island, *Dieffenbach.*

A very handsome plant, which, though variable in foliage, cannot be confounded with any other: it is found in New Ireland, Australia, Tasmania, Norfolk Island, and New Zealand.—*Stems* prostrate below, then tall, erect, rigid, woody, stiff, 1–3 feet high, copiously fastigiately branched; branches rarely spreading and lax, densely covered with squarrose, spreading or closely imbricated, appressed, subulate, acuminate, rarely hair-pointed leaves: the character of the branches depends on the form and disposition of the leaves, which are sometimes short, erect, closely appressed, sexfariously imbricated, when the branches are slender; when the leaves are spreading and incurved, the branches appear stouter. *Spikes* cylindrical, $\frac{1}{2}$–$\frac{3}{4}$ inch long, sessile, blunt, squarrose from the spreading, scarious, yellow scales, which are peltate, triangular, serrulate or erose. The *spores* are hispid, with short, blunt projections.

5. Lycopodium *laterale*, Br.; caulibus repentibus, ramis ascendentibus erectisve et elongatis foliosis simplicibus v. divisis, foliis undique imbricatis squarroso-patentibus incurvis anguste subulatis integris, spicis brevibus lateralibus cylindraceis, squamis subquadrifariam imbricatis late triangulari-ovatis

coriaceis.—*Br. Prodr. Labill. Sert. Aust. Caled. p.* 10. *t.* 15. *A. Cunn. Prodr. Spring, Monog. p.* 82.

Var. *β. diffusum*.—L. diffusum, *Br. Prodr.*

HAB. Northern and Middle Islands; in wet, grassy places, *Cunningham, etc.*

A variable plant in habit; native of New Caledonia, Australia, Tasmania, and New Zealand.—*Stems* procumbent, sparingly branched below; branches slender, erect, simple or sparingly divided, 3 inches to a span tall, covered with patent, flexuose, squarrose, narrow, subulate leaves, which are $\frac{1}{3}$ inch long. *Spikes* axillary, sessile, erect, $\frac{1}{2}$ inch long. *Scales* quadrifarious, coriaceous, very broadly ovate or rounded, suddenly contracted to a rather long stiff point; margin scarious, white, very narrow.—In alpine places, both in Tasmania and New Zealand, this plant becomes procumbent, shorter, stiffer, and with broader, shorter leaves: such specimens appear to me to be *L. diffusum*, Br. M. Spring considers (Hook. Herb.) a small state of *L. fastigiatum* to be *L. diffusum*, Br., and also rightly refers the Tasmanian specimen of *L. diffusum* to *L. laterale*, var. *β. minor*, Spring.

6. Lycopodium *cernuum*, Linn.; caule repente ramoso, ramis erectis rigidis subfastigiatim ramosis ramosissimisve, ramulis apice curvis, foliis setaceo-subulatis squarroso-patentibus incurvisque integerrimis carinatis decurrentibus, spicis brevibus ramulis terminalibus cylindraceis, squamis multifariam imbricatis ovatis longe acuminatis serratis.—*Linn. Sp. Pl. Spring, Monog. p.* 79.

HAB. Northern parts of the Northern Island: Bay of Islands, in humid forests, *Cunningham, etc.*

Though not hitherto found in any part of Australia or Tasmania, this is one of the most widely diffused plants, being found in all moist, warm latitudes,—from the Azores to the Cape of Good Hope and New Zealand in the Old World, and from Mexico to South Brazil in the New,—and is often called "Stag's-horn Moss," from its divaricating, curved branches.—*Stems* stout, woody, creeping, often 2–3 feet long, sending up erect, rigid branches, which are fastigiately branched. *Leaves* numerous, imbricated all round the stem, narrow, subulate, patent and incurved, decurrent, $\frac{1}{3}$–$\frac{1}{4}$ line long. *Spikes* short, $\frac{1}{3}$ inch, sessile on the generally incurved tops of the branchlets. *Scales* ovate or ovate-lanceolate, with acuminate points and toothed margins.

§ c. *Leaves imbricated all round the stem (sometimes obscurely secund or bifarious). Spikes peduncled.*

7. Lycopodium *Carolinianum*, Linn.; caule repente radicante, foliis ascendentibus curvis lanceolato-subulatis, pedunculis lateralibus strictis erectis elongatis foliosis, spica elongata stricta solitaria, squamis peltatis sub-6-fariam imbricatis erecto-patentibus e basi late ovata longe acuminatis margine scariosis serrulatis integrisve.—*Linn. Sp. Pl. Dill. Musc. t.* 62. *f.* 6. *Spring, Monog. p.* 98. L. Drummondii, *Spring, Monog. pt.* 2. *p.* 35. L. serpentinum? *Kunze in Plant. Preiss. v.* 2. *p.* 108.

HAB. Northern Island: Bay of Islands and East Coast, *Colenso.*

A native of Tasmania, Western Australia, and various tropical and subtropical parts of the world.—*Stems* creeping, rooting, 3–5 inches long, covered with curved, ascending, lanceolate-subulate leaves, $\frac{1}{6}$ inch long and upwards. *Peduncle* erect, stiff, 1–4 inches long, covered with small, erect, subulate leaves. *Spike* 1–2 inches long, erect, cylindrical. *Scales* peltate, arranged in about six rows, stiff, spreading, broadly ovate below, with long, rigid points, and scarious, generally toothed margins.—M. Spring names this *L. Drummondii* (in Herb. Hook.), a species which he distinguishes from *L. Carolinianum* chiefly by the white edges of the leaves and scales of the spike, which character however does not appear in the New Zealand plant. The scales are more or less toothed in this species, sometimes being nearly entire, and the leaves appear to be bifarious in some specimens from South Africa and South America.

8. Lycopodium *clavatum*, L.; var. *Magellanicum*; caule vage repente elongato, ramis erectis fastigiatim ramulosis, foliis lineari-subulatis squarroso-incurvis patentibusve integerrimis, pedunculis terminalibus solitariis geminisve strictis erectis sparse foliosis, spicis elongatis cylindraceis, squamis peltatis e basi trapezoidea subulato-acuminatis recurvis margine scariosis denticulatis, sporis granulatis.—*Flor. Antarct. p.* 113. L. Magellanicum, *Swartz, Syn. Fil. Spring, l. c. p.* 97. *pt.* 2. *p.* 16. L. fastigiatum, *Br. Prodr. Spring,*

Monog. pt. 1. *p.* 88. *pt.* 2. *p.* 41. L. Pichinchense, *Hook. Ic. Pl. t.* 85. L. heterophyllum, *Hook. et Grev. Ic. Fil. t.* 113. L. diffusum, *Spring, Monog., non Br. Prodr.*

HAB. Mountains of the Northern and Middle Islands, *Banks and Solander, etc.*

In the 'Flora Antarctica' I have discussed at some length the variations of *L. clavatum*, of which I believe this plant to be a southern state, distinguishable in most cases by the quite entire leaves, that have not a hair-like point. It inhabits Lord Auckland's and Campbell's Island, the mountains of Tasmania and South America, and in the South Sea Islands and the Cordillera is found passing into the *L. clavatum* of the north temperate hemisphere, a cosmopolitan plant, to which M. Spring rightly refers nearly a dozen species of various authors.—*Stems* extensively creeping, stout, woody, sending up strict, erect, fastigiately branched or panicled branches, 3–12 inches high. *Leaves* imbricated, spreading, incurved or squarrose, linear-subulate, entire. *Peduncles* terminal, solitary or two together, strict, erect, more or less leafy, the leaves often whorled. *Spikes* 1–2½ inches long, erect, cylindric. *Scales* peltate, trapezoid and toothed at the base, with long recurved points. *Spores* granulated on the surface.—Very stunted alpine specimens have procumbent branches and subsecund ascending leaves. I have seen specimens with short peduncles, approaching *L. densum* in general appearance, but the form of the recurved scales of the spike distinguishes this at once.

§ d. *Leaves bifarious.*

9. Lycopodium *scariosum*, Forst.; caule basi repente vage ramoso, ramis subcomplanatis divaricatim ramulosis, foliis aliis majoribus bifariis decurrentibus integerrimis falcato-lanceolatis acutis coriaceis opacis marginibusve et apicibus scariosis aliis minoribus cauli appressis subulatis stipulæformibus, spicis terminalibus longe v. brevissime pedunculatis subsexfariam imbricatis pedunculo folioso, squamis e basi ovata acuminatis denticulatis erectis demum recurvis, apicibus sæpe scariosis, sporis laxe reticulatim areolatis, areolis depressis.—*Forst. Prodr. Fl. Antarct. p.* 112. *Hook. Ic. Plant. t.* 966. *Spring, Monog. p.* 106. L. decurrens, *Br. Prodr. t.* 966. L. Jussieui, *Desv. Encycl. Bot. Hook. Ic. Pl. t.* 185. *Spring, l. c. p.* 108. L. reptans, *Banks et Sol. MSS.* L. Hænkii, *Presl.* L. Lessonianum, *A. Rich. Flora?*

HAB. Mountains of the Northern Island, *Colenso;* more common in the Middle and Southern Islands, on the ground, often in woods, *Banks and Solander.*

Originally discovered by Banks and Solander in New Zealand, and since found in Tasmania (*L. decurrens*, Br.), Lord Auckland's Group, Chili, and throughout the Andes of South America, in New Granada, and the mountains of Jamaica. Spring retains the *L. Jussieui* (which originated in American specimens) as a distinct species, founding his characters on the erect stem, elongate peduncles, and some other equally variable characters.—*Stems* creeping, stout, rooting, often 2 feet long, sending out flattened, flabellately-divided, compressed branches. *Leaves* of two kinds; the larger bifarious, decurrent, falcate, ovate lanceolate, acute or acuminate, laterally flattened, very coriaceous; smaller on the under side of the branches only, more numerous, subulate, appressed to the stem. *Spikes* 1–2½ inches long, cylindrical, solitary or geminate, on long or short terminal peduncles, which are often 8 inches long, and covered with imbricate, subulate leaves. *Scales* somewhat sexfariously disposed, ovate, with rather broad recurved points and toothed margins.

10. Lycopodium *volubile*, Forst.; caule alte scandente volubili tenui ramoso, ramis compressis subflabellatim ramulosis, foliis majoribus bifariis falcatis lanceolatis acuminatis, minoribus subulatis appressis stipulæformibus, spicis in pedunculos nudos dichotomos subpaniculatim dispositis gracilibus pendulis, squamis erectis 4–5-fariam imbricatis e basi late rotundata abrupte acuminatis, sporis granulatis.—*Forst. Prodr. Hook. et Grev. Ic. Fil. t.* 70. *Spring, Monog. p.* 105. L. spectabile, *Blume, fid. Herb. Hort. Acad. Lugd. Bat.* (*Hb. Hook.*) *Spring, Monog. p.* 109. L. D'Urvillei? *A. Rich. Flor., fid. Spring.*

HAB. Northern and Middle Islands, as far south as Banks' Peninsula, *Banks and Solander, etc.* Nat. name, "Wae-wae koukou" (owl's foot), *Col.*

I know of no other places in which this fine plant grows but New Zealand and Java. There is however in Herb. Hook. a specimen marked as from Owhyhee by Mr. Menzies, whose localities I have several times had occasion to doubt; and M. Spring adds Society Islands (Forster) and King George's Sound (Herb. Webb.), the latter an unlikely habitat. The native women are fond of adorning their hair with the fronds of this, which is by far the most beautiful of any species I know.—*Stems* slender, twining, climbing over trees and bushes, many feet long, wiry, sparingly leafy, much branched. *Branches* spreading, compressed, dichotomously divided. *Leaves* of two kinds; larger bifarious, distichous, laterally flattened, spreading, lanceolate, falcate, top incurved, acuminate, decurrent, coriaceous, smaller or stipulary leaves subulate, appressed to the stem. *Spikes* numerous, drooping, in branched dichotomous panicles ½–2½ inches long, obscurely quadrifarious, slender. *Scales* small, rounded, abruptly contracted into a subulate point, margins toothed. *Spores* broadly pyriform, the broader hemispherical end granulated, transparent towards the smaller end.

Obs. *L. Phlegmaria*, L., introduced into Cunningham's Prodromus on the faith of a specimen from Menzies, labelled "Dusky Bay," is a tropical plant, which cannot be assumed to be a native of New Zealand without better evidence. A specimen so marked in Cunningham's Herbarium, and gathered by himself, is *L. Billardieri.*

Gen. IV. PSILOTUM, *Swartz.*

Capsulæ 3-loculares, 3-valves, axillis foliorum sitæ, coriaceæ, opacæ, sporis minimis farctæ.—Caulis *nudus, aphyllus v. foliis minimis squamæformibus;* ramis *triquetris.*

A very widely distributed Fern, found in America from Carolina and Florida to South Brazil, in India, the Atlantic and Pacific Islands, and Australia and New Zealand.—*Stems* rigid, erect or pendulous, 2 inches to a foot high, simple below, dichotomously branched above; branches three-angled, bearing a few distant scale-like leaves. *Capsules* large, coriaceous, three-lobed, three-celled, full of very minute spores, which burst in water and discharge a cloud of excessively minute particles.—This genus differs in habit and the three-celled capsules from *Tmesipteris.* (Name from ψιλος, *naked;* in allusion to the leafless stem and exposed capsules.)

1. Psilotum *triquetrum,* Swartz, *Syn. Fil. Br. Prodr.* Lycopodium nudum, *Linn.*

Hab. Northern Island: Bay of Plenty, *Mr. Joliffe.*

Nat. Ord. XCVIII. MARSILEACEÆ, *Br.*

Gen. I. AZOLLA, *Lam.*

1. Azolla *rubra, Br. Prodr.* p. 167.

Hab. Northern Island: East Coast and interior, *Colenso, etc.*

A native of Australia and Tasmania.

Nat. Ord. XCIX. CHARACEÆ, *Rich.*

Gen. I. NITELLA, *Ag.*

1. Nitella *Hookeri, Braun in Hook. Journ. Bot. v.* 1. *p.* 199 (1849).

Hab. Northern Island; in still water, not uncommon, *Colenso, etc.*

Originally found in Kerguelen's Land, which is its only other known habitat.

Obs. Several other species of this genus, and of the allied genus *Chara,* have been sent from New Zealand, but the specimens are not in a fit state for satisfactory determination.

Nat. Ord. C. MUSCI, *Juss.*

By William Wilson, Esq.

Suborder 1. ANDREÆACEÆ.

Gen. I. ANDREÆA, *Ehr.*

Theca in receptaculo exserto sessilis, fere ad basin valvulis quatuor dehiscens; valvulis apice operculo persistente connexis. *Calyptra* mitræformis.

1. Andreæa *acutifolia*, Hook. fil. et Wils.; foliis erecto-patentibus incurvis rigidis lanceolato-subulatis acutis concaviusculis basi gibbosis enervibus siccitate erectis.—*Flor. Antarct. p.* 118, 396. *t.* 151. *f.* 2.

Hab. Northern Island: Ruahine mountains, *Colenso.*

Found in various Antarctic Islands, Cape Horn, and on the Andes of Quito.—There are two varieties in New Zealand: one taller, about $\frac{1}{3}$ inch in length, with foliage reddish, not lurid.

2. Andreæa *rupestris*, Linn.; foliis e basi subvaginante patentibus ovato-acuminatis minus acutis apice subobliquis dorso papillosis enervibus siccitate appressis.—*Linn. Hook. et Tayl. Musc. Brit.* 2. *t.* 8. *Fl. Antarct. p.* 396.

Hab. Northern Island; in mountainous localities, *Colenso.* (A native of Britain.)

Found in Britain and in all parts of the world, on subalpine rocks.—*Foliage* dull reddish-brown, inclining to black, not glossy, often subsecund. *Leaves* ovato-subulate.

Suborder 2. SPHAGNACEÆ.

Gen. II. SPHAGNUM, *L.*

Theca globosa, in receptaculo exserto sessilis, stomate nudo exannulato. *Calyptra* medio rupta, basi persistente. *Fructificatio* axillaris.

1. Sphagnum *cymbifolium*, Dill.; caule robusto elongato, ramis confertis brevibus tumidis, foliis rotundo-ovatis concavis obtusis apice dorso muricatis, utriculis (cellulis ramulorum externis) spiraliter striatis. —*Bridel, Bryol. Univ.* S. obtusifolium, *Hook. et Tayl. in part.* S. latifolium, *Hedw., Smith, etc. Fl. Antarct. p.* 398.

Hab. Northern Island, *Colenso.* (A native of Britain.)

Found in Britain and in all parts of the globe, in peat-bogs, etc., where it contributes largely to the formation of peat.

2. Sphagnum *compactum*, Bridel; caulibus dense cæspitosis fastigiatis, ramis confertis brevibus erecto-patentibus, foliis ovato-subulatis obtusis præmorsisve apice concaviusculis subincurvis, utriculis estriatis.—*Bridel, Br. Univ. Schwægr. Suppl. t.* 3. S. latifolium, β minus, *Hook. et Taylor.*

Var. *ambiguum;* laxe cæspitosum, ramis patulis, foliis latioribus subovatis apice vix incurvis.

Hab. Northern Island: marshy ground, Bay of Islands, *J. D. H., Colenso.* (A native of Britain.)

The New Zealand plant much resembles *S. contortum* (Schultz), and has, like that, only a single layer of cortical cellules on the stem; but the leaves are blunt or præmorse, and the reticulation is larger.

3. Sphagnum *fimbriatum*, Wilson; caule gracili elongato, ramis gracilibus attenuatis deflexis, foliis caulinis obovatis obtusis apice fimbriatis, cæteris ovato-lanceolatis acuminatis, perichætialibus squamis obovatis obtusis cucullatis.—*Wils. in Fl. Antarct. p.* 398. S. acutifolium, *Hook. et Taylor, in part.*

Var.; ramis subinde quinatis confertis, foliis latioribus.

Hab. New Zealand, Middle Island, *Lyall.* (A native of Britain.)

4. Sphagnum *cuspidatum*, Dill.; caule elongato subflaccido, ramis remote fasciculatis deflexis attenuatis, foliis caulinis ovato-acutis patulis, cæteris lanceolatis sensim acuminatis siccitate margine undulatis.—*Bridel, Bryol. Univ. Hook. et Taylor. Fl. Antarct. p.* 398.

Var. β. *recurvum;* foliis brevioribus siccitate recurvis.—S. recurvum, *P. Beauv. Prodr. Bridel, Bryol. Univ.*

Var. γ. *plumosum;* foliis longioribus sensim attenuatis.—*Bridel, Bryol. Univ.*

Hab. Northern Island, *Colenso.* Var. γ, found by Mr. Oldfield. (A native of Britain.)

Suborder 3. BRYACEÆ.

Section 1. Acrocarpi.—*Fruit terminal.*

Tribe I. Phasceæ.

Gen. III. PHASCUM, *L.*

Capsula elliptica, subrotunda, apiculata, astoma (operculo persistente), brevi-pedicellata. *Calyptra* cucullata vel conico-campanulata. *Florescentia* monoica.

Subgenus 1. Acaulon, *Bryol. Europæa.—Gemmæforme, perpusillum, annuum.* Capsula *globosa, immersa.* Calyptra *minima, capsulæ vertice insidente.*

1. Phascum (Acaulon) *apiculatum*, Hook. fil. et Wils.; foliis in bulbillo arcte conniventibus obovato-subrotundis acuminulatis concavis integerrimis nervo valido excurrente apiculatis. (Tab. LXXXIII. Fig. 1.)

Hab. Northern Island: Hawke's Bay; on the ground, *Colenso.*

Plants gregarious, smaller than mustard-seed, reddish.—*Leaves* clustered into a roundish bulb, appressed, the two innermost nearly equal, and larger than the rest, their apices erect, margins not at all reflexed; nerve thickened at the top, distinctly excurrent, reddish. *Capsule* immersed, globose, erect, on a very short, slender pedicel. *Calyptra* conico-mitriform, minute.—In the allied British species, *P. muticum*, Schreb., the leaves are less closely connivent, have recurved apices, the inner perichætial leaf overtops the rest, the nerve is not excurrent, margin not reflexed, and the reticulation is larger.—Plate LXXXIII. Fig. 1:—1, plant, *natural size;* 2, the same, *magnified;* 3, capsule and perichætial leaf; 4, capsule; 5, calyptra; 6, leaf; 7, apex of the same:—*all magnified.*

Subgenus 2. Pleuridium.—Caules *tenelli, filiformes, innovationibus annuis continuati (perennes), subramosi.* Capsula *brevi-pedicellata, erecta, ovata, brevi-apiculata, terminalis, vel (per innovationes) lateralis.* Calyptra *plerumque cucullata.* Vaginula *oblongo-cylindrica.*

2. Phascum (Pleuridium) *nervosum*, Hook.; caule brevi subsimplici, foliis inferioribus ovatis superioribus elliptico-lanceolatis longe acuminatis appressis crassinerviis (nervo excurrente), capsula immersa apiculata.—*Hook. Musc. Exot. t.* CV. *Schwægr. Suppl. t.* 296 a.

Hab. Northern Island: Bay of Islands; on clay hills, *J. D. H., Colenso.*

Found at the Cape of Good Hope, and a variety with submuticous leaves, in Pennsylvania. Nearly allied to *P. alternifolium*, Bryol. Europ., having several axillary gemmiform male flowers; but distinguished by the shorter, closely imbricated leaves.—*Capsule* often laterally exserted on a curved pedicel in our New Zealand specimens, and more evidently apiculate than shown in the figure in Musc. Exot.—Some of our specimens have numerous sterile julaceous surculi, with widely ovate muticous denticulate leaves, closely resembling those of Pennsylvanian specimens.

Tribe II. Weissiæ.

Gen. IV. GYMNOSTOMUM, *Hedw.* (*in part.*)

Peristomium nullum. *Capsula* erecta, ovalis, oblonga vel subrotunda, æqualis. *Annulus* obscurus,

persistens. *Operculum* oblique rostratum. *Calyptra* cucullata.—Caules *perennes.* Florescentia *monoica, dioicave;* fl. mas. *gemmæformis.*

This genus is here, as in 'Bryologia Europæa,' restricted to Gymnostomous Mosses, with the habit of *Weissia.* The former character is however merely negative, and of frequent occurrence (by suppression) in many Peristomous genera. Other Gymnostomous Mosses are now referred to those groups with which, irrespective of the peristome, they have the closest affinity: thus *Physcomitrium* has the general structure, aspect, and inflorescence of *Funaria;* other species are referred to *Bartramiæ,* and the minute annual species to *Seligeriæ.* According to the arrangement pursued in 'Bryologia Europæa,' these Gymnostomous Mosses may belong to any family of the Order, and even *Phascoid* Mosses may be similarly dispersed. The genus *Hymenostomum,* which is retained in Bryol. Europ., does not appear to be distinct, for some of its species, and amongst them the only New Zealand one, has not the assumed generic character of a contracted mouth of the capsule, and consequent adhesion, after maturity, of the sporular sac to the apex of the columella.

1. Gymnostomum *calcareum,* Nees et Hornsch.; compacte cæspitulosum, caule ramoso tenerrimo, foliis lineari-lanceolatis patulis obtusiusculis margine planis, capsula ovali-oblonga brevicolla erythrostoma, operculo subulato-conico.—*Nees et Hornsch. Bryol. Germ. Bridel, Bryol. Europ.*

Var. 2; foliis longioribus siccitate crispulis.

HAB. Northern Island: on clay soil, near the Bay of Islands. Var. 2, on lime-walls.

One of the smallest of the genus, found chiefly on calcareous rocks in Europe, but not frequent. The long operculum, nearly equalling the capsule, distinguishes this from *G. tenue,* its smaller size from *G. rupestre.*

2. Gymnostomum *tortile,* Schwægr.; caulibus ramosis pulvinato-cæspitosis, ramis fastigiatis, foliis confertis patentibus sursum curvatis siccitate incurvo-tortilibus oblongo-lanceolatis obtusiusculis apiculatis crassinerviis solidioribus margine incurvis, capsula crassiuscula ovali, operculo longirostro.—*Schwægr. Suppl. t.* 10. *Nees et Hornsch. Bridel.* Hymenostomum tortile, *Bryol. Europ.*

Var. 2; foliis magis patulis acuminatis.

Var. 3; foliis angustioribus minus confertis acuminatis.

HAB. Northern Island: on clay soil, Bay of Islands, *J. D. H., Colenso.*

Very similar to *Weissia controversa;* distinguished by the absence of peristome and more robust habit; leaves of firmer texture, wider and less strongly incurved in the margin.

Gen. V. WEISSIA, *Hedwig.*

Peristomium simplex, dentes sedecim, æquidistantes, basi liberi, lanceolati v. lineari-lanceolati, transverse trabeculati, dorso convexi, integri vel pertusi, interdum apice bifidi, siccitate erecti vel patentes. *Capsula* erecta, ovali-oblonga. *Annulus* persistens v. 0. *Operculum* oblique rostratum.—Caules *perennes.* Florescentia *monoica dioicave;* fl. mas. *gemmæformis.*

1. Weissia *controversa,* Hedw.; cæspitosa, foliis lanceolatis lineari-lanceolatisve margine incurvis et involutis costa percursa mucronatis, capsula ovali siccitate substriata, operculo conico-rostellato, peristomii dentibus subintegris lineari-lanceolatis obtusiusculis.—*Hedw. Musc. Frond. Schwægr. Hook. et Tayl.* W. viridula, *Bridel, Bryol. Europ.*

HAB. Northern Island: near the Bay of Islands, *J. D. H.* Auckland, *Knight.* (A native of England.)

A very common British species, found in almost all parts of the world, on earthy banks, readily distinguished by the involute margins of the leaves. It was however unknown to Linnæus, and the name *Bryum viridulum,* L., proves to have been misapplied to this Moss.

2. Weissia *flavipes,* Hook. fil. et Wils.; cæspitosa, foliis lineari-lanceolatis angustatis elongatis

margine incurviusculis subplanis costa percurrente mucronulatis erecto-patentibus siccitate intortis, seta elongata luteola, capsula subcylindrica elongata erecta erythrostoma, peristomii dentibus acutis denticulatis perforatis, operculo tenuirostri. (TAB. LXXXIII. Fig. 2.)

HAB. Northern Island: near the Bay of Islands, *J. D. H.*

Distinguished from *W. controversa* by the long, slender, pale yellow fruit-stalks, nearly half an inch in length, more cylindrical and elongated pale capsule, apparently destitute of annulus, by the longer, distinctly perforated red teeth, which are denticulate or rough with transverse articulations, and taper from the base, and by the almost plane margins of the leaves, which are narrower and longer than in that species. The inflorescence, as in that, is monoicous. *Didymodon leptocarpus*, Br. et Schimp., from Abyssinia, strongly resembles our Moss, but differs in the structure of the peristome (with setiform, very slender, smooth teeth), in the coarser texture of the fragile leaves (like those of *D. cylindricus*), and in the naked axillary male flowers. *W. inflexa*, Hook., is scarcely more than a variety of *W. controversa*, with narrower leaves and paler setæ than usual. Our Moss has the operculum longer and more slender than in any variety of *W. controversa*, and the peristome appears to be quite different in structure, approaching that of *Trichostomum*.—PLATE LXXXIII. Fig. 2:—1, plant, *natural size;* 2, capsule and operculum; 3, capsule with operculum removed; 4, teeth; 5, leaf; 6, apex of leaf:—*all but fig.* 1 *magnified.*

Gen. VI. SYMBLEPHARIS, *Montagne.*

Peristomium simplex. *Dentes* 8, breves, bigeminati (vel 32 quaternatim approximati), erecti, siccitate in conum conniventes. *Capsula* subcylindrica, elongata, erecta, microstoma. *Calyptra* cylindrico-subulata, elongata, dimidiata. *Perichætii* folia longissima, vaginantia.—Olomitrium, *Bridel.* Sprucea, *Hook. fil. et Wils. in Flor. Antarct.*

The above definition is confirmed by that of Dr. Montagne (Ann. Sc. Nat. 1837), and the name *Symblepharis* takes precedence of *Sprucea. Lophiodon*, nob. (Fl. Antarct. p. 130), has the habit of *Trichostomum*, and sixteen teeth only, united in pairs.—*Symblepharis* is allied in habit to *Weissia* through *W. crispula*, and may be found to constitute a group; but the species require further investigation.

1. Symblepharis *perichætialis*, Wils.; caule erecto ramoso, foliis confertis erecto-patentibus siccitate crispis e basi lanceolata subulato-attenuatis integerrimis canaliculatis margine planis nervo continuo, perichætialibus longissimis vaginantibus, capsula oblonga erecta, operculo conico-subulato recto.—Trichostomum perichætiale, *Hook. Musc. Exot. t.* 73. Olomitrium perichætiale, *Bridel.* Acalyphum cylindricum, *P. Beauv.*

HAB. Northern and Middle Islands: Bay of Islands; on the trunks of trees, *J. D. H.* Dusky Bay, *Menzies.* Middle Island, *Lyall.*

Variable in size, and in the length, direction, and form of the leaves, more or less gradually tapering from the ovate-lanceolate base, are somewhat keeled, their substance firm, the margin entire, obscurely thickened, areolæ dot-like.—*Setæ* 1 inch long and under, pale. *Annulus* small, persistent. *Operculum* as long as the capsule, almost setaceous. *Calyptra* above twice as long. *Teeth* dull red, thirty-two, erect, sometimes recurved when moist. *Male inflorescence* not found.—This Moss seems to have a circumscribed range (Mauritius and Campbell's Island being the only other localities); it may however occur in South America, where, and in Mexico, other species are found.

Tribe III. FISSIDENTEÆ.

Gen. VII. FISSIDENS, *Hedw.*

Peristomium simplex. *Dentes* 16, æquidistantes, longiusculi, lanceolati, linea media percursa, in crura duo raro tria inæqualia subulata fissi, crebre articulati, hygroscopici, siccitate geniculato-incurvi. *Calyptra*

cuculliformis, raro conico-mitræformis. *Fructificatio* in caule primario vel in ramis brevibus secundariis terminalis.—Folia *disticha, equitantia, alternantia, dorso in alam et apice in laminam verticalem scalpelliformem producta, compresso-canaliculata, semiamplexicaulia.*—Dicranum, *Hook. et Tayl. in part.*

Distinguished from *Dicranum*, as a natural group, by the distichous vertical leaves; but similar in the structure of the peristome.

§ a. *Folia marginata.*

1. Fissidens *bryoides*, Hedw.? foliis late lanceolatis marginatis integerrimis nervo subexcurrente, capsula erecta elliptica, operculo conico acuminato, floribus masculis in caule fertili axillaribus.—*Bridel, Bryol. Univ. Bryol. Europ.* Dicranum bryoides, *Hook. et Tayl.*

Hab. Northern Island: Bay of Islands, *J. D. H.*, specimens imperfect. (A native of Britain.)

This species is one of the most common in Europe and North America.

2. Fissidens *viridulus*, L.; caule simplici decumbente, foliis lanceolatis marginatis integerrimis lamina dorsali supra basin discontinuata nervo subcontinuo, capsula erecta ovali-oblonga, operculo conico-acuminato, fl. masc. terminali vel basilari gemmæformi.—Bryum viridulum, *L.* Dicranum viridulum, *Swartz, Musc. Suec.* Fissidens viridulus, *Wahlenberg.* F. incurva, *Bryol. Europ.* (*partly*), *non Schwægr.*

Var. foliis rigidis acuminatis margine valde cartilagineo-limbatis.—F. acuminatus, *MSS.*

Hab. Northern Island: Bay of Islands, *J. D. H.*

Common throughout Europe and America. Distinguished from *F. bryoides* by the position of the male flowers, which are never axillary.

3. Fissidens *incurvus*, Schwægr.; caule, foliis florescentiaque *F. viriduli*, capsula cernua incurva.—*Schwægr. Suppl.* 1. *v.* 2. *p.* 5. *t.* 49. *Bryol. Europ. ex parte.*

Hab. Northern Island, *Colenso.*

Of this small species there are several varieties, one with leaves almost as much acuminated as in *F. acuminatus*, others with leaves almost destitute of the pellucid cartilaginous border, except on the sheathing part.

4. Fissidens *rigidulus*, Hook. fil. et Wils.; caule gracili elongato ramoso polyphyllo, foliis rigidulis siccitate subcrispis ovato-lanceolatis acutiusculis (lamina verticali brevi) margine valde incrassatis, nervo valido pellucido continuo, capsula terminali ovali suberecta, operculo rostellato, fl. masc. terminali. (Tab. LXXXIII. Fig. 3.)

Hab. Northern and Middle Islands: East Cape, *Dr. Sinclair.* Wellington, *Lyall.* Auckland, *Knight.*

Taller and more rigid than the preceding, with lurid green foliage.—*Stems* 1–2 inches long, branched. *Leaves* less crowded, bluntish, rigid, the entire cartilaginous border broad and much thickened. *Setæ* 2–3 lines long, pale, slender, often two to three together. *Capsules* small, short, oval, somewhat gibbous on one side. *Operculum* half as long as the capsule.—Plate LXXXIII. Fig. 3:—1, plant, *natural size;* 2, fruit and perichætial leaf; 3, tooth of peristome; 4, calyptra; 5, leaf; 6, transverse section of leaf:—*all but fig.* 1 *magnified.*

5. Fissidens *brevifolius*, Hook. fil. et Wils.; caule humili e basi surculis sterilibus longioribus crescente, foliis surculorum confertis ovatis brevissimis cymbiformibus integerrimis basi vaginante tantum marginatis, caulinis dissitis longius acuminatis angustatis lamina dorsali discontinua, capsula suberecta. (Tab. LXXXIII. Fig. 4.)

Hab. Northern Island, *Colenso.*

A small species not ½ inch long, allied to *F. viridulus*, but differing in the very short cymbiform leaves, and in the habit of growth, which connects it closely with *F. tamarindifolius*, Smith. Male flower gemmiform at base of the barren shoots. *Fruit* terminal.—It is found also at the Cape of Good Hope, and at Mendoza, South

America.—Plate LXXXIII. Fig. 4:—1, plant, *natural size;* 2, the same, *magnified;* 3, capsule; 4, 5, leaves:—*all but fig.* 1 *magnified.*

b. *Foliis immarginatis.*

6. Fissidens *æruginosus,* Hook. fil. et Wils.; caule brevi pusillo decumbente, foliis strictis confertis anguste lanceolatis acuminatis opacis nervo continuo pellucido percursis margine scaberulis, capsula terminali. (Tab. LXXXIII. Fig. 5.)

Hab. Northern Island, *Colenso.*

A neat little Moss, with flabelliform fronds as large as *F. tenellus,* from which it differs in the narrower, more acuminated leaves; tip evidently crenulate, not altered by drying. It resembles *F. elegans,* Schwægr.; but that has the leaves wider, not tapering above, and the sheathing part bordered, approaching more nearly to the ambiguous varieties of *F. incurvus.*—*Male flowers* basilar and gemmiform, as in the allied species. *Leaves* with dot-like reticulation, verdigris-green.—We possess only a few fragments mixed with another Moss. *F. campylopus,* Mont. (Ann. Sc. Nat. Cent. 5, 48), from Chili, though closely allied to this, is described as having axillary male flowers, and presents other marks of difference.—Plate LXXXIII. Fig. 5:—1, plants, *natural size;* 2, the same, *magnified.*

7. Fissidens *tenellus,* Hook. fil. et Wils.; caule pusillo decumbente 6–8-phyllo, foliis lineari-lanceolatis acutis crenulatis basi vaginante denticulatis nervo valido concolore continuo subexcurrente, capsula erecta, operculo longirostri, calyptra papillosa mitriformi. (Tab. LXXXIII. Fig. 6.)

Hab. Northern and Middle Islands: Bay of Islands, *J. D. H.* Auckland, *Sinclair.* Thomson's Sound, *Lyall.*

One of the smallest of the genus, very like *F. exilis,* Hedw. (*F. Bloxami,* Wilson in Lond. Journ. Bot.), differing thus:—*Leaves* narrower, more acute, not oblique; cellules smaller. *Annulus* none. *Operculum* longer, its margin composed of twice as many cellules. *Teeth* of peristome larger, rough at the back with sharp prominences. *Calyptra* papillate at the apex.—*F. Hornschuchii,* Mont. (*F. Brasiliensis,* Hsch., *F. serrulatus,* Fl. Bras.), is a larger species, with wider and shorter leaves, and axillary, clustered male flowers. In *F. tenellus* the male flower is gemmiform and basilar.—Plate LXXXIII. Fig. 6:—1, plants, *natural size;* 2, 3, the same, *magnified;* 4, leaf, *magnified.*

8. Fissidens *pallidus,* Hook. fil. et Wils.; dioicus? fronde breviuscula flabelliformi decumbente, foliis lineari-lanceolatis elongatis confertis acutis integerrimis siccitate inflexis, capsula cernua, operculo longirostri. (Tab. LXXXIII. Fig. 7.)

Hab. Northern Island, *Colenso.*

Fronds cæspitose, flabelliform, pale yellowish-green, glossy. *Leaves* very slightly altered by drying, more acute than in the following species, with larger and more pellucid hexagonal areolæ, the dorsal lamina narrower at the base. *Inflorescence* probably dioicous; (we find no male flowers.) *Capsule* terminal, cernuous, curved (unripe in our specimens), shorter than the operculum. *Calyptra* submitriform, inflexed at the base.—*F. glaucescens,* Hsch. (*lanceolatus,* Bruch), from the Cape of Good Hope, is allied, but the fructification is lateral, leaves crenulate, capsule suberect, frond linear. *F. falcatus,* Wils. MSS., from Madras, is equally different, and has leaves more tapering and acute, and more incurved when dry.—Plate LXXXIII. Fig. 7:—1, plant, *natural size;* 2, the same, *magnified;* 3, leaf, *magnified.*

9. Fissidens *oblongifolius,* Hook. fil. et Wils.; monoicus, fronde lineari-elongata polyphylla, foliis confertis erecto-patentibus elongatis anguste ligulatis obtusiusculis integris siccitate subinflexis, seta gracili, capsula minuta ovali inclinata, fl. masc. axillari. (Tab. LXXXIII. Fig. 8.)

Var. *β. capitatus;* caule apice androgyno, foliis subulato-lanceolatis acutiusculis apice crenulatis.

Hab. Northern Island: Bay of Islands, both varieties on rocks, near waterfalls, *J. D. H.*

Stems $\frac{1}{3}$ inch long. *Leaves* crowded, twenty or more on each side, slightly incurved when dry, of almost equal width throughout in the typical form, gradually tapering upwards in var. *β*; nerve pale and pellucid, vanishing

below the apex, which is more or less crenulate; areolæ roundish, more opaque than in the preceding. *Capsule* remarkably small for the size of the plant, subcernuous, pale, on a slender pedicel. *Male flowers* axillary, scattered here and there along the stem, terminal with the seta in var. *β.*—PLATE LXXXIII. Fig. 8:—1, plant, *natural size;* 2, capsule; 3, leaves; 4, apex of leaf, *magnified.*

10. Fissidens *ligulatus,* Hook. fil. et Wils.; dioicus, fronde lineari-elongata polyphylla, foliis remotiusculis suberectis ligulatis obtusis margine subcrenulatis apice denticulatis siccitate involuto-crispulis nervo valido pellucido evanido, seta crassiuscula, capsula cernua macrostoma, operculo æquali. (TAB. LXXXIV. Fig. 1.)

HAB. Northern Island: Bay of Islands, near waterfalls, *J. D. H., Colenso, Sinclair.* Auckland, *Knight.*

Somewhat taller and more robust than the last, from which it is readily distinguished when dry by the distant involute crisped foliage.—*Leaves* more obtuse and more truly ligulate, the dorsal wing ceasing considerably above the base. *Seta* strong, flexuose, rather short. *Male flower* terminal on separate stems, growing often apart from the fertile plant.—PLATE LXXXIV. Fig. 1:—1, plant, *natural size;* 2, capsule; 3, part of peristome; 4 and 5, leaves; 6, apex of leaves:—*all magnified.*

11. Fissidens *dealbatus,* Hook. fil. et Wils.; dioicum, tenellum, foliis 3-jugis oblongis acuminatis lamina apicali folium excedente anguste marginatis enervibus cellulis magnis hyalinis rhomboideis, capsula suberecta ampullacea sub ore constricta, operculo rostrato capsula longiore. (TAB. LXXXIV. Fig. 2.)

HAB. Northern Island: Bay of Islands, growing very sparingly with *F. incurvus,* var. *acuminatus, J. D. H.*

Somewhat larger than the allied American species *F. hyalinus,* Hook. et Wils., and distinguished by the bordered leaves, larger areolæ, and longer operculum.—*Peristome* longer, the teeth when dried paired. *Annulus* none. *Calyptra* reddish-brown, conico-subulate.—It differs from *F. reticulosus,* Schimp., in the complete absence of a nerve.—PLATE LXXXIV. Fig. 2:—1, plants, *natural size;* 2, a plant, *magnified;* 3, immature capsule; 4, calyptra; 5, mature capsule; 6, immature, and 7, mature opercula; 8, leaf:—*all magnified.*

Gen. VIII. CONOMITRIUM, *Montagne.*

Peristomium simplex. *Dentes* 16, bifidi, ut in *Fissidente,* sed linea media nulla, plerumque truncati, irregulares. *Calyptra* conica, basi subintegra. *Capsula* minuta, brevi-pedicellata, erecta, æqualis, pedicello sensim in capsulam dilatato, collumque spurium sistente.—*Folia* Fissidentis *remota, lamina dorsali longiore.* Plantæ *fluitantes, teneræ, filiformes, ramosæ.*

1. Conomitrium *Dillenii,* Montagne; caule frondiformi fluitante ramoso, foliis alternis distichis oblongo-lanceolatis subscalpelliformibus erectis evanidinerviis, pedunculis solitariis (rarius gemellis) axillaribus cauligenis, capsula ovata, operculo cuspidato incurvo.—*Montagne in Ann. des Sc. Nat.* 1837, *et Crypt. D'Orbigny Voy.* Skitophyllum Dillenii, *La Pyl.* Octodiceras Dillenii, *Bridel.*

HAB. Northern Island: East Coast, in watercourses, *Colenso.*

In our specimens the male and female flowers are contiguous, and the teeth of the peristome regular.

Tribe IV. DICRANEÆ.

Gen. IX. DICNEMON, *Schwægr.*

Peristomium simplex. *Dentes* 16, ultra medium bipartiti, cruribus nodosis incurvis. *Calyptra* magna, cucullata. *Capsula* elongata, inæqualis, perichætio elongato vaginante fere immersa.—Caulis *reptans, surculis erectis ramosis.* Habitus *sciuroideus* Leucodontis. Vita *arborea, perennis.*

Bridel, who first distinguished *Dicnemon* from *Leucodon*, considered it as pleurocarpous; it is truly acrocarpous. In the peristome, in the structure of the leaves, and in the form of the capsule, the affinity with *Dicranum* is most intimate, and the principal difference consists in the branched creeping habit. In the mode of production of the male flowers it is further closely connected with *Dicranum* through *D. Sieberianum*, twice figured by Schwægrichen, once as *Sclerodontium pallidum* (*Leucodon*, Hort. Musc. Exot., *hypnoides*, Br.), and through *Syrrhopodon Taylori* (Hort. Musc. Exot.), which probably belongs to the genus *Dicranum*, or at least to this group.

1. Dicnemon *calycinum*, Wils. et Hook.; caule repente, surculis erectis ramosis, ramis teretibus acutis, foliis imbricatis ovato-lanceolatis concavis abruptinerviis, perichætialibus vaginantibus, capsula oblongo-cylindrica curvula strumulosa, operculo e basi conica oblique subulato.—Leucodon calycinus, *Hook. Musc. Exot.*

Hab. Northern Island: Bay of Islands, common on limbs of trees, *J. D. H.* Port Nicholson, *Lyall*. Auckland, *Knight*.

Fructification often truly terminal, but in some cases the presence of innovations makes the fruit appear lateral.—*Calyptra* large, inflated below prior to the swelling of the capsule, as in *Funaria*, roughish at the summit, completely covering the fruit, half the length of the perichætium, from which it is but half exserted. *Capsule* oblique, unequal (as in most *Dicrana*), tapering below into the pedicel. *Male flowers* nidulant amongst the leaves of the fertile stem, their organic origin uncertain, and their occurrence quite irregular, most frequent on stems of advanced growth.

Gen. X. LEUCOBRYUM, *Hampe.*

Peristomium simplex. *Dentes* 16, lanceolato-subulati, bicrures, transverse articulati, intus trabeculati, extus strigilosi. *Capsula* cernua, ovalis, gibba, collo strumoso, operculo longirostri, coriacea, 8-striata, sicca sulcata.—Folia *spongiosa, e cellularum stratibus* 2 *pluribusve conflata* (*cellulis quadrato-hexagonis porosis*), *enervia, glauca vel albida.*

Separated by Hampe, and in 'Bryologia Europæa,' from *Dicranum*, on account of the peculiar structure and colour of the leaves. In all other respects the species seem referable to *Dicranum*.

1. Leucobryum *candidum*, Hampe; caule erecto ramoso fragili dichotomo, foliis dense imbricatis erectis vel secundis subfalcatisve ovato-lanceolatis concavis dorso tuberculatis corrugatis, ramulis fructiferis brevissimis axillaribus numerosis, capsula cernua strumosa sulcata.—Dicranum candidum, *Bridel, Br. Un. Schwægrichen, Suppl. t.* 187. Bryum candidum, *Dillen. Musc.*

Hab. Throughout the Islands, on decayed wood and at the roots of trees; but seldom in fruit.

Variable in size.—*Leaves* more or less falcate, secund; in exposed dry situations shorter, straighter, more spreading and subsquarrose [*D. brachyphyllum*, Hsch.; Sprengel, Syst. v. 4. p. 322?], always tuberculated at the back near the apex, the tubercles forming transverse, oblique wrinkles, whence the profile of the leaves is denticulate. *Fructification* usually lateral in appearance, each stem bearing two or more contiguous fertile ramuli, easily mistaken for perichætia. Such ramuli in an abortive state, bearing archegonia (pistilla), are copiously found on all the stems.—This Moss, according to Schwægrichen, is monoicous, probably with nidulant male flowers, as in the preceding. We have as yet only found male flowers on separate (barren) stems in axillary clusters, as in *Octoblepharum*. The capsules, etc., are scarcely different from those of *Dicranum* (*Leucobryum*) *glaucum*.

Gen. XI. DICRANUM, *Hedwig, etc.* (*in part.*)

Peristomium simplex. *Dentes* 16, basi confluentes, sicci et humidi arcuato-conniventes, lanceolati, ad medium et ultra in crura duo subulata inæqualia divisi, intus plus minus trabeculati. *Capsula* plerumque

cernua, oblonga, inæqualis. *Operculum* longirostre, rostro obliquo. *Calyptra* cucullata.—Folia *limbo e cellularum strato unico conflato, nervata.* Caules *erecti (non repentes), perennes, cæspitosi.*

1. Dicranum *Tasmanicum,* Hook. fil.; dioicum, caule elongato erecto, foliis laxiusculis patentibus lanceolato-oblongis obtusis canaliculatis integerrimis apice concavis evanidinerviis siccitate incurvis crispulis, capsula erecta turbinata macrostoma, operculo longirostri.—*Hook. Ic. Plant. t.* 248.

Var. 2; foliis laxioribus latioribus, apice cymbiformibus.

Var. 3; foliis angustatis subulatis crassinerviis (apice recto) haud concavis.

HAB. Northern and Middle Islands: Dusky Bay and Jackson's Bay, *Lyall.* Auckland, *Knight.* East Coast, wet cliffs, etc., *Colenso.*

Closely allied to *D. virens, D. pellucidum,* and *D. squarrosum,* growing like the two latter in wet places, and subject to considerable variation.—*Leaves* very concave at the apex, which is sometimes slightly reflexed; colour variable from pale green to lurid, often reddish-brown, as in the original specimen from Tasmania. *Teeth* frequently trifid, but by no means constantly so (as occurs in *D. cerviculatum* and in other species), large, erect, or spreading when dry. *Male flowers* on separate plants. *Stem* 1 inch long or more. *Capsule* of firm texture, on a stout pedicel, ½ inch long. *Operculum* with a slender inclined beak larger than the capsule, *annulus* absent.—Var. 3 is a curious form, probably growing near running water, and may be compared with an analogous form of *Hypnum hispidum.*

2. Dicranum *vaginatum,* Hook.; caule elongato ramoso gracili, foliis remote imbricatis e basi lata quadrata vaginante lineari-subulatis rigidis crassinerviis subintegris, capsula ovata erectiuscula, operculo longirostri.—*Hook. Musc. Exot. t.* 141, *non Fl. Antarct.*

Var. *β. clathratum;* foliis luridis, peristomii dentibus perforatis subtrifidis, capsula turbinata.

HAB. Northern Island: Bay of Islands, wet rocks, falls of Kiri-kiri, etc., *J. D. H.*

Our specimens agree well with the original in all essential points.—*Leaves* distant, scarcely altered when dry, suddenly narrowed from the broad sheathing base into a long, subulato-setaceous, widely patent prolongation, the squarrose portion of the leaf consisting of the thick predominant nerve, which is slightly toothed at the apex. *Teeth* of the peristome longer than in allied species, rough with prominent papillæ, variously perforated, the articulations distant and often connecting the divisions. *Annulus* none. *Capsule* more or less erect, ovate or turbinate. *Stems* 1–2 inches long, slender. *Inflorescence* dioicous.—Found also in the Andes of Columbia and Colchagua.

D. vaginatum of Fl. Antarct. p. 407, from Hermite Island, proves different, having leaves gradually tapering from the dilated base, channelled above; apex acute, entire; nerve not predominant.

3. Dicranum *campylophyllum,* Tayl.? "caule cæspitoso, surculis subsimplicibus erectis, foliis subdistantibus, ex oblonga arcte vaginante basi elongate subulatis integerrimis, nervo tenui percursis, apice flexuoso incurvis; capsula ovata, erecta, subæquali; operculo rostrato."—*Lond. Journ. Bot. v.* 7. *p.* 281.

HAB. Northern Island, *Colenso.*

Of this Moss little can be determined, belonging as it does to an intricate series of forms closely allied to *D. Schreberi.* The description agrees with some examples from the Andes of Quito, in Dr. Jameson's collection, whence *D. campylophyllum* and *D. Jamesoni,* Taylor, were derived. *D. Gayanum,* Montagne, is another form of the series, resembling *D. filiforme* (*vulcanicum,* Bridel), and to these must be added *D. Guilleminianum* and *D. aulacocarpum,* Mont. Our Moss has leaves longer, more rigid than *D. Schreberi,* less suddenly dilated below, with a stronger nerve, and the capsule, though more or less oblique, is without any appearance of struma. *Operculum* longer. *Inflorescence* dioicous.

4. Dicranum *Schreberi,* Hedw.; caule breviusculo subsimplici, foliis e basi dilatata vaginante lanceolato-subulatis patentibus siccitate flexuosis canaliculatis subintegris nervo debili percursis, capsula ovato-oblonga cernua, operculo brevirostri capsulæ subæquali.—*Hedw. Spec. Musc. t.* 33. *Bridel, Br. Un.*

HAB. Northern Island: Bay of Islands, on moist banks, *J. D. H.* (A native of Britain.)

The perfectly entire margin of the leaf in our specimen is a deviation from the type of the species, and it thus approaches to *D. Grevilleanum*, Bryol. Europ. The inflorescence however is dioicous, and the operculum is shortly rostrate. Found in Britain and throughout Europe.

5. Dicranum *dicarpon*, Nees; caule robusto dense radiculoso-tomentoso, foliis patulis squarrosis subsecundis ex ovato-lanceolato basi linearibus cuspidatis flexuosis striatis solidinerviis strigosis margine dorsoque argute spinuloso-serratis, setis brevibus geminatis longe vaginatis, capsulis curvatis cernuis, operculo longirostri.—*Sprengl. Syst. Veg. v.* 4. *p.* 322. *Schwægr. Suppl. t.* 251.

Var. *β. spinosum;* caule elatiore, setis aggregatis numerosis (3–8) longioribus.—D. spinosum, *Wils. MSS.*

Hab. Northern and Middle Islands: Ship Cove, *Lyall.* East coast, *Colenso.*

Found in New Holland and Tasmania.

6. Dicranum *fasciatum*, Hedw.; caule radiculoso-tomentoso, foliis confertis secundis lanceolato-subulatis canaliculatis nervo tenui percursis substriatis apice spinuloso-serratis, perichætialibus elongatis vaginantibus longe acuminatis apice setaceis spinulosis, setis brevissimis subgeminatis, capsula subexserta oblonga curvata substrumosa, operculo longirostri.—*Hedw. Sp. Musc. t.* 28 (*fig. mala*). *Bridel, Br. Un.*

Hab. Northern Island: Bay of Islands, *Sinclair, J. D. H.*

If the specimens are rightly named, Hedwig's figure and description are very inaccurate, yet they seem to have been intended to represent our Moss, which is a beautiful species, with glossy, yellowish-green, substriated leaves, that are shorter and more membranaceous than in the preceding, less strongly serrated, and the nerve narrow and inconspicuous (overlooked probably by Hedwig). The perichætial leaves taper gradually to a setaceous point and frequently overtop the capsules.—*Calyptra* roughish at the apex. *Annulus* distinct. *Male flowers* either nidulant on the fertile stems, or occasionally on distinct male plants, and then not nidulant, but developed in the normal manner.

7. Dicranum *Billardieri*, Bridel; caule elato, foliis falcato-secundis ovato-lanceolatis acuminatis concavis membranaceis estriatis apice serrulatis, seta longiore, capsula subcylindrica curvata basi strumifera, operculo longirostri.—*Bridel, Br. Un.* 1. 401. *Schwægr. Suppl. t.* 121. *Fl. Antarct. pp.* 129, 407.

Hab. Throughout the Islands; common at the roots of trees, forming immense tufts.

This has the leaves wider and more concave below than in the allied species, more membranous, and not striated when dry; nerve narrow. A native of Tasmania, Lord Auckland's Island, and Fuegia.

8. Dicranum *robustum*, Hook. fil. et Wils.; caule elongato, foliis falcato-secundis longissimis lineari-lanceolatis setaceo-attenuatis convolutis spinuloso-serrulatis, nervo latiusculo excurrente, perichætialibus vaginantibus, capsula cylindracea inclinata curvula strumulosa.—*Fl. Antarct. p.* 406. *t.* 152. *f.* 8.

Var. *β;* capsula suberecta minus curvata, foliis perichætialibus elongatis sensim acuminatis.

Hab. Middle Island: Jackson's Bay, *Lyall.*

These and other specimens in an imperfect state induce us now to believe that *D. pungens*, nob., of Fl. Antarct. Part I. t. 59. f. 1, is not essentially distinct from *robustum*, and that the perichætial leaves vary, no less than the size, direction, etc., of the capsule, and of the leaves. Lyall's specimens combine the characters of both, in the leaves and perichætium, with the peculiarity of an erect, nearly straight capsule. The leaves are more or less setaceo-acuminate, sometimes almost capillary at the extremity, more or less evidently serrulate; nerve variable in width, but always rather narrow and well defined.—A native of Lord Auckland's Group, Campbell's Island, Kerguelen's Land, and Fuegia.

9. Dicranum *setosum*, Hook. fil. et Wils.; caule fragili subramoso, foliis strictis fragilibus suberectis confertis longissime lanceolato-setaceis apice minute serrulatis nervo latiusculo in aristam longam excurrente, seta longiuscula, capsula oblonga curvata.—*Fl. Antarct. p.* 129. *t.* 58. *f.* 5.

Hab. Middle Island: Port Preservation, *Lyall.*

Of this a few fragmentary specimens are present. The species is known by the very slender, setiform, fragile leaves, whose nerve is predominant in the upper half, occupying the whole width of that part. It is a native of Lord Auckland's Group and Campbell's Island.

10. Dicranum *Menziesii*, Tayl.; caule dense radiculoso-tomentoso, foliis confertis secundis subrigidis basi lanceolatis serrulatis siccitate strictis crassinerviis, seta brevi, capsula oblonga suberecta substrumosa subexserta, operculo longirostri.—*Tayl. in Phytologist*, 2. *p.* 1094. *Fl. Antarct. p.* 128. *t.* 58. *f.* 4.

Var. *β. rigidum*; foliis rigidioribus minus confertis nigro-viridibus patulis subfalcatis, caule robustiore.

Hab. Throughout the Islands, common: Dusky Bay, *Menzies.*

Stem densely tomentose, with whitish, fibrous radicles, producing male nidulant flowers. *Leaves* yellowish-green, silky, crowded, setaceous; nerve thick and strong, prominent, very conspicuous in a dry state, by which the species is readily distinguished from *D. setosum* and its allies. Found also in Lord Auckland's Group.

11. Dicranum *Sieberianum*, Hornsch.; caule ramoso fastigiato, foliis falcatis convoluto-canaliculatis ovato-lanceolatis acuminatis superioribus piliferis tenuissime pellucido-marginatis dorso papillosis calycinis vaginatis piliferis, capsula longe pedunculata ovali cernua parva, operculo longirostri.—*Schwægr. Suppl. t.* 252. Leucodon pallidus, *Hook. Musc. Exot.*

Var. *β*; foliis siccitate appressis vix undulatis dorso sublævibus.

Hab. Northern Islands: Bay of Islands, *Cunningham.* Var. *β*, in muddy places on rocks, *J. D. H.*

Colour yellowish. The var. *β.* not unlike a *Bartramia.*—*Leaves* entire, not serrated as described by Schwægrichen.

Gen. XII. DICRANODONTIUM, *Bryol. Europ.*

Peristomium simplex. *Dentes* 16, lineari-lanceolati, remotius articulati, infra medium vel ad basin usque bifidi; crura inæqualia, subulata. *Capsula* in pedicello arcuato demissa, æqualis, vix striata. *Operculum* oblique subulatum, annulo angusto persistente. *Calyptra* cucullata, lævis, haud basi fimbriata.—Habitus *Dicranoideus.* Folia *basi vaginantia, dilatata; nervo lato dorso lævi prædominante.*

This group partakes much of the habit and character of *Campylopus*, differing in the absence of fringe to the calyptra, and in the want of lamelliform ridges on the nerve at the back of the leaf.

1. Dicranodontium *proscriptum*, Hornsch.; caule gracili simplici, foliis secundis remotiusculis e basi dilatata vaginante capillaceis rigidis crassinerviis integerrimis, seta arcuata, capsula elliptica siccitate substriata, operculo rostrato.—Cynodon proscriptus, *Hornsch. in Hor. Ber.* Didymodon proscriptus, *Bridel, Bryol. Univ.* Dicranum rostratum, *Arnott in Herb. Hook.* Campylopus capillaceus, *Hook. fil. et Wils. in Lond. Journ. Bot.*

Var. *β*; elatior, foliis distantibus squarroso-patulis flexuosis basi vaginante subrotundis magis dilatatis vaginantibus, nervo solido excurrente semitereti, capsula inæquali substrumosa siccitate striata.

Var. *γ*; caule humili, foliis confertis falcato-secundis, capsula ut in *var. β.*—Dicranum flexifolium, *Schwægr. Suppl. t.* 185? (*non Hook. Musc. Exot.*)

Hab. Northern Island: Bay of Islands, *J. D. H.*

This Moss, abundant in St. Helena, is very variable, and it is only after attentive examination that the above varieties, different as they are in aspect, are here treated as forms of one species. They agree especially in the teeth being marked with fine longitudinal striæ, as in *Trematodon.*—*Annulus* large and distinct. *Capsule* faintly striated when dry. *Seta* curved when moist, straight when dry. *Calyptra* quite destitute of fringe. *Inflorescence* dioicous. *Campylopus humilis*, Mont. (Cent. 5. 39), from Brazil, must be different from the above, which seems to occur also on the Neilgherrie Mountains in the Peninsula of India.

Gen. XIII. CAMPYLOPUS, *Bridel.*

Peristomium ut in *Dicranis heteromallis*. *Capsula* in pedicello arcuato inter folia comalia (superiora) demissa, ovalis, æqualis vel gibba, striata; operculo oblique rostrato. *Annulus* duplex, revolubilis. *Calyptra* cucullata, basi fimbriata.—Fructus *sæpius aggregati*. Folia *nervo lato inconspicuo dorso plus minus lamellato prædominante instructa, plerumque lanceolato-setacea*. Florescentia *dioica*.

The fringed calyptra and arcuate seta distinguish the group from *Dicranum;* and even in a barren state the structure of the leaves presents an obvious differential character.

1. Campylopus *leptodus*, Montagne; caule prolifero, ramis fasciculatis, foliis lanceolato-subulatis strictis pilo brevi albo denticulato terminatis, comalibus recurvis, pedunculis aggregatis (singulo perichætio circumdatis) flexuosis, capsula oblonga recta lævi basi vix tuberculata, operculo subulato, calyptra basi fimbriata apice exasperata, peristomii dentibus tenuibus fere ad basin bifidis, cruribus gracillimis longissimis subpapillosis.—*Montagne in Ann. Sc. Nat.* 1845, *Cent.* 5. 40. C. leptocarpus, *Wils. MSS.*

HAB. Northern Island, *Colenso.*

The specimens are doubtingly named, and the description is abridged from that of Dr. Montagne. The erect, smooth, subcylindrical capsules, and the erect, obscurely white-tipped leaves, are remarkable. It is closely allied to *Didymodon gracile*, Hook. (Musc. Exot.), which is a *Campylopus*, but in that the capsule is oblique, and the leaves are appressed and not white-tipped.

2. Campylopus *xanthophyllus*, Mont.; caule prolifero apice capitato-incrassato, foliis confertis lanceolato-subulatis canaliculatis siccitate strictis pilo denticulato albo terminatis nervo latissimo percursis, pedunculis aggregatis, capsula inæquali substrumosa.—*Mont. in Ann. Sc. Nat.* 1845, *Cent.* 5. 41.

HAB. Middle Island: Akaroa, *Raoul.* Dusky Bay, *Lyall.*

Named by the description only.—Specimens variable: some have erect yellowish leaves, in others the dry leaves are somewhat recurved and dark green, the stems densely tomentose with rust-red radicles as in the British *C. flexuosus*, from which it chiefly differs in the white tips of the leaves. The yellow state resembles *C. strictus*, Tayl. MSS., from St. Helena, but that is not white-tipped. *C. atrovirens*, Bryol. Europ., may not be specifically different from our Moss.

3. Campylopus *pallidus*, Hook. fil. et Wils.; caule breviusculo simplici, foliis confertis suberectis e basi lanceolato-ovata subulato-setaceis pilo albo spinuloso terminatis nervo latissimo spongioso percursis cellulis laxis, pedunculis aggregatis crassis, capsula subpyriformi pallida pachyderma siccitate sulcata ore purpureo, operculo brevirostri, calyptra brevi fimbriata. (TAB. LXXXIV. Fig. 3.)

HAB. Northern Island: East Coast and Auckland, *Colenso, Sinclair.*

Very nearly allied to *C. fragilis*, Bryol. Europ. (a var. of *C. densus* of that work), having the same lax, spongy texture of the leaves, but the nerve is wider and more completely predominant, the peduncles much thicker and stronger, the operculum and calyptra very short, the capsule symmetrical, pyriform, pachydermous, strongly furrowed and cylindrical when dry, pale, except the dark purple mouth and peristome.—*Leaves* very pale green or whitish, of very soft texture, the upper lamina constituting the nerve with large cellules (as seen in a section).—Our New Zealand Moss, with white-tipped setaceous leaves, is probably a variety: the more typical form of the species may be assumed to be that gathered by Dr. Jameson in the Andes of Quito, with leaves shorter, less setaceous, destitute of white terminations, but in other respects agreeing with our New Zealand specimens, especially in the thick peduncles and in the operculum, which is shorter than the capsule.—*Dicranum nodosum*, P. Beauv., is most closely allied to our Moss in the leaves, but differs in habit.—PLATE LXXXIV. Fig. 3:—1, plants, *natural size;* 2, portion of plants, *magnified;* 3, capsule; 4, operculum; 5, calyptra; 6, leaf:—*all magnified.*

4. Campylopus *clavatus*, Br.; caule dichotomo fasciculato, foliis lanceolato-acuminatis piliferis solidinerviis strictis aureis, capsula pendula striata.—*Schwægrichen, Suppl. t.* 255 *a.*

HAB. Middle Island, *Lyall*; barren specimen.

Our specimen is much allied to *C. introflexus*, but has leaves with very short white tips, not suddenly deflexed as in that species. Also a Tasmanian Moss.

5. Campylopus *introflexus*, Hedw.; caule erecto ramoso, foliis imbricatis e basi lata concava marginibus pellucida acuminato-lanceolatis piliferis, nervo lato, pilo spinuloso divaricato, capsula obovata inæquali.—*Hedwig, Sp. Musc. t.* 29. *Bridel, Bryol. Univ.*

HAB. Northern Island; clay hills, common.

Remarkable for the geniculate deflection of the white, rough, hair-like terminations of the leaves, which are suddenly contracted at the bent part from the lanceolate base; nerve broad and well defined below; areolæ of the marginal portion of the leaf narrow, elongated, and pellucid. This species seems to be frequent in the Southern Hemisphere, and no doubt variable.—*Dicranum pudicum*, Hornsch., probably belongs to this; a variety with wider leaves (barren) was gathered in New Zealand by Dr. Lyall.

6. Campylopus *bicolor*, Hornsch.; foliis confertis strictis lanceolato-subulatis obtusis apice concavis.

HAB. Northern Island, *Colenso.*

This Moss appears to be rare, and is described from barren specimens, remarkable for the blunt, concave apices of the leaves, blackest in the lower part of the stem, glossy green above; nerve broad.

Gen. XIV. TREMATODON, *Richard.*

Peristomium simplex. *Dentes* 16, lanceolati, in crura duo inæqualia fissi, articulati, strigillati et granulati. *Calyptra* inflato-cucullata. *Capsula* apophysi longa attenuata instructa, cernua, oblonga, annulata. *Operculum* longirostre.—Habitus *Dicranoideus*. Folia *angusta.*

1. Trematodon *longicollis*, Rich.; foliis subulato-setaceis siccitate flexuosis, perichætialibus longissimis, capsula elongata cernua apophysi basi subcerviculata multo longiore, operculo conico rostellato.—*Richard in Michaux Flor. Amer. Boreal. Schwægr. Suppl. t.* 120? *Bridel.*

HAB. Northern and Middle Islands: Bay of Islands, on moist clay banks, *J. D. H.* Wellington, *Lyall.*

Two forms: one with leaves gradually tapering to an acute apex; the other with linear, abrupt leaves, denticulate at the apex; nerve thick, predominant. Schwægrichen's figure represents the leaves much too short and erect. Found in North and South America, and in the East Indies, Hongkong, and Java.

Tribe V. TRICHOSTOMEÆ.

Gen. XV. TORTULA, *Schreb.*

Peristomium simplex. *Dentes* 32, longissimi, filiformes, sinistrorsum contorti, hygroscopici, basi membrana brevi vel in tubum producta coaliti. *Capsula* erecta, oblonga, annulata. *Operculum* conico-subulatum, oblique rostratum.

Nearly allied in habit to *Trichostomum*, but having the teeth of the peristome evidently contorted, and composed of two differently coloured laminæ.

1. Tortula *chloronotos*, Brid.; caule brevissimo subsimplici, foliis imbricatis late ovatis concavis piliferis margine reflexo, nervo filamentoso gemmiparo, capsula elliptico-oblonga.—*Bridel, Bryol. Univ. t.* 539. *Bryol. Europ.*

HAB. Northern Island, *Colenso.*

Entire plant about ⅓ inch long, more dwarfish than *T. membranifolia* (Hook. Musc. Exot.); leaves of softer texture, with opaque cells (not pellucid and colourless), their margins slightly reflexed: they agree however in the monoicous inflorescence, and the gemma-like mass of short filaments attached to the nerve in the cavity of the leaf is the same in both.—Found in the Pyrenees and in Sardinia.

2. Tortula *torquata*, Taylor; foliis confertis erecto-patentibus siccitate spiraliter arcteque contortis lanceolatis acuminatis integerrimis margine revolutis, nervo valido subexcurrente, capsula erecta oblonga, operculo subulato.—*Taylor in Lond. Journ. Bot. v.* 5. *p.* 50.

HAB. Northern Island, *Colenso.*

Nearly allied to the British *T. unguiculata*, but the leaves gradually tapering, acute, revolute or strongly recurved in the margin and the nerve, scarcely excurrent.—Found in Australia (Swan River).

3. Tortula *Australasiæ*, Hook. fil. et Wils.; caule breviusculo subsimplici, foliis lineari-lanceolatis acutis patente-recurviusculis siccitate crispis tortilibus carinatis margine subreflexis nervo rubello percursis, capsula ovato-cylindracea, operculo brevi-rostrato.—Trichostomum Australasiæ, *Hook. et Grev. in Brewst. Journ. Sc. v.* 1. *p.* 301. *t.* 12. Tortula rufiseta, *Taylor in Lond. Journ. Bot. v.* 5. *p.* 51.

Var. β; foliis obtusis latioribus subligulatis.

HAB. Northern Island: Bay of Islands, *Colenso, J. D. H.*

Remarkable for its red setæ and the reddish hue of the foliage, in which, and in the form and texture of the leaves, it much resembles *Didymodon rubellus*, but the inflorescence is dioicous. The teeth of the peristome, though oblique, as in some other species of *Trichostomum*, are not obviously contorted, and it is thought best, after careful examination of the original specimens, to remove it to this genus.—Variable in the width and bluntness of the leaves, and in some states nearly approaching to the next species. Also found in Australia.

4. Tortula *cæspitosa*, Schwægr.; monoica, foliis confertis lineari-lanceolatis elongatis mucronatis margine planis undulatis siccitate crispato-tortilibus, nervo pellucido, capsula oblongo-cylindrica pallida, operculo subulato, floribus masculis axillaribus gemmæformibus pedicellatis.—*Schwægr. Suppl. t.* 120. Barbula cirrhata, *Bridel, Bryol. Europ.* (*non* T. cæspitosa, *Hook. et Grev.*)

HAB. Northern Island: Bay of Islands, *Colenso, J. D.H.*

A tall branched form of the species (much resembling *T. tortuosa*, but differing essentially in the monoicous inflorescence), with leaves more tapering than in the typical North American specimens, occurs in the New Zealand collection, in company with the ordinary form.

5. Tortula *calycina*, Schwægr.; caule brevissimo subramoso, foliis lanceolatis subundulatis margine planis crassinerviis perichætialibus elongatis vaginantibus, seta longissima, capsula suberecta elliptico-oblonga, operculo longissimo subulato.—*Schwægr. Suppl. t.* 119. *Bridel.* T. flexuosa, var.? *Hook. Musc. Exot.*

HAB. Northern Island: Bay of Islands, *J. D. H., Colenso.* Auckland, *Knight.*

The long, slender setæ, with the sheathing perichætium, and neat, small capsule, are remarkable.—The original specimens of *T. flexuosa*, from the Cape of Good Hope, have the leaves tapering and acute from a broader base, more erect and not obviously undulated, but in all essential characters they seem to be the same species. Also found in Australia and Tasmania.

6. Tortula *serrulata*, Hook. et Grev.; caule elongato subramoso, foliis lanceolatis carinatis acuminatis apice serrulatis margine plano, nervo valido subexcurrente, capsula cylindracea inclinata.—*Hook. et Grev. in Brewst. Journ. Sc. v.* 1. *p.* 299. *tab.* 12.

HAB. Northern Island: shores of Waikare Lake, *Colenso.*

Colour of foliage orange-brown. *Peristome* united below into a tube. Margin of leaf plane above, but reflexed near the base.—Dioicous? Said to be found in Fuegia.

7. Tortula *Mülleri*, Bruch et Schimp.; hermaphrodita, caule elongato dense folioso radiculoso-tomentoso, foliis imbricato-patentibus rectis imbricatis siccitate imbricatis oblongo-ovatis obtusis concavis margine reflexis costa purpurea in pilum subspinulosum canum excedente, capsula cylindrica subarcuata.—*Bryol. Europ.*

HAB. Northern and Middle Islands: shores of Waikare Lake, *Colenso*. Bay of Islands, *J. D. H.* Port Cooper, *Lyall.*

Foliage usually reddish. The bisexual inflorescence is not constant, but certainly present in our specimens. Base of peristome tubular. *Leaves* less spreading than in the common British species *T. ruralis*, to which it is nearly allied.—Found in Europe, and in the Falkland Islands.

8. Tortula *mnioides?* Schwægr.; foliis laxe imbricatis patulis siccitate crispis undulatis ovato-lanceolatis acuminatis pellucido-marginatis.—*Schwægr. Suppl. t.* 310.

HAB. Northern Island, *Colenso.*

Specimens few and barren, referred with doubt to *T. mnioides*, which we have not seen.—*Leaves* much crisped and patulous when dry, distant, yellowish, of firm texture, very acute, and somewhat gemmiferous at the apex.—Approaches *Syrrhopodon fasciculatus* in aspect, but may easily be mistaken for a species of *Mnium.*

Gen. XVI. DESMATODON, *Bridel.*

Peristomium simplex. *Dentes* 16, bi-trifidi, crura tetragona, remote articulata, granulosa, plerumque articulationibus singulis connexa, humida, erecta, sicca incurva vel sinistrorsum subconvoluta; paullisper hygroscopica. *Calyptra* cucullata.—Habitus *Trichostomi.* Florescentia *monoica: fl. mas. axillaris, gemmæformis.*

An imperfectly defined genus, intermediate between *Tortula* and *Trichostomum.*

1. Desmatodon *nervosus*, Bruch et Schimp.; caule humili, foliis patentibus siccitate convolutis ovali-oblongis apiculatis concavis margine revoluto-reflexis, nervo valido superne incrassato excurrente, capsula ovali erecta exannulata, operculo suboblique conico-rostellato, peristomii dentibus inæqualibus.—*Bryol. Europ.* Didymodon nervosus, *Hook. et Tayl.* Trichostomum convolutum, *Brid.*

HAB. Northern Island, *Colenso.* (A native of Britain.)

This Moss, remarkable for the thickened nerve, varies much in the peristome, which is sometimes wholly absent or (at the Cape of Good Hope, etc.) with the teeth evidently twisted, in which state it has been described as a *Tortula* (see Musc. Exot.). Found in Europe and North America. Frequent on the sea-coast.

Gen. XVII. TRICHOSTOMUM, *Hedw., Brid.* (*ex parte.*)

Peristomium simplex. *Dentes* 32, plus minus perfecti, per paria approximati, filiformes, tetragoni, granulosi, crebre articulati, intorti (gemelli inæquales et sæpe trabeculis plus minus connexi). *Capsula* oblonga, erecta. *Calyptra* cucullata.—Florescentia *monoica vel dioica: fl. mas. gemmæformis.*

1. Trichostomum *lingulatum*, Hook. fil. et Wils.; caule brevissimo, foliis patentibus confertis ovato-lingulatis obtusis subflaccidis evanidinerviis carinatis siccitate erectis, seta brevi, capsula rotundo-ovata erecta, operculo conico-subulato. (TAB. LXXXIV. Fig. 4.)

Var. β; foliis longioribus, capsula subcylindrica, operculo longius rostrato.

HAB. Northern Island: Bay of Islands, *J. D. H.* Var. β, *Colenso.*

A more dwarfish species than the preceding, and of pallid hue.—*Leaves* rounded and obtuse at the apex, more flaccid, very slightly reflexed in the margin, areolæ rather larger. *Inflorescence* dioicous, and annulus wanting in

both species. Differs essentially from *Didymodon splachnifolius*, Hook. (Musc. Exot.), and from the supposed var. *Weissia flaccida*, Harvey, in the peristome and operculum. *Desmatodon amblyophyllus*, Montagne, is described with spathulate leaves and excurrent nerve, and is otherwise unlike our plant. An ambiguous form of this, found at East Cape by Dr. Sinclair, approaches to *T. Australasiæ* in the leaves, but has a short capsule.—Plate LXXXIV. Fig. 4:—1, plant, *natural size;* 2, seta and calyptra; 3, immature, and 4, mature capsule; 5, portion of peristome; 6, 7, leaves:—*all magnified.*

2. Trichostomum *phæum*, Hook. fil. et Wils.; caule breviusculo, foliis erecto-patentibus rigidiusculis lanceolato-oblongis carinatis acutis integerrimis siccitate crispulis margine planis opacis, nervo continuo pellucido, capsula oblonga erecta, perist. dentibus membrana basilari connexis. (Tab. LXXXIV. Fig. 5.)

Hab. Northern Island: shores of Waikare Lake, *Colenso.*

Specimens few and imperfect.—*Foliage* purplish-brown, of rather thick texture, more opaque than the continuous nerve, somewhat concave or conduplicate at the apex, elsewhere carinate, entire. *Peristome* defective, teeth oblique, as in *Tortula*. *Operculum* (found loose) rather short.—*Trichostomum Schimperi*, Mont. Cent. 5, 37, seems to be allied, but has obtuse leaves and the nerve discontinued.—Plate LXXXIV. Fig. 5:—1, plants of *natural size;* 2, capsule; 3, portion of peristome; 4, leaf; 5, apex of ditto:—*all magnified.*

3. Trichostomum *mutabile*, Bruch; foliis lineari-lanceolatis subcarinatis alis subundulatis siccitate crispatis mucronatis margine subplanis, capsula ovali, operculo longe rostrato, annulo nullo, peristomii valde mutabilis dentibus brevissimis inæqualibus.—*Bryol. Europ.* Trichostomum brachydontium, *Bruch.*

Hab. Northern Island, *Colenso.* (A native of England.)

This Moss is usually found near the sea-coast in Britain, and is rare in fruit. The leaves approach those of *Tortula cæspitosa*, but their texture is less fragile. The often abortive peristome renders it difficult at times to distinguish this from *Gymnostomum tortile.*

4. Trichostomum *strictum?* Bruch; foliis erecto-patentibus strictis ovato-lanceolatis acuminatis costa crassa excurrente mucronatis.—*Bryol. Europ.*

Hab. Northern Island, *Colenso.*

Barren specimens only, intermixed with *T. lingulatum*, referred very dubiously as above.—*Leaves* yellowish, rather distant, erect and incurved when dry; margin plane.

5. Trichostomum *longifolium*, Brid.; caule erecto ramoso, foliis confertis erecto-patentibus subsecundis e basi lanceolata subulato-setaceis solidinerviis apice subdenticulatis, capsula erecta subcylindrica.—*Bridel, Bryol. Univ. v.* 1. *p.* 496? Didymodon, *Fl. Antarct. p.* 408.

Hab. Northern Island, *Colenso.* Wairarapa Valley, Auckland, *Knight.*

Our specimens, few and incomplete, differ from those from Hermite Island, and described in the 'Flora Antarctica,' in the shorter stem, the more elongated capsule, and the light green lax foliage; but we find no essential difference.—*Inflorescence* monoicous, as in *T. pallidum*, to which it is allied, but has more setaceous leaves, and the nerve is thick and predominant.—A native of Fuegia.

6. Trichostomum *laxifolium*, Hook. fil. et Wils.; caule brevissimo simplici, foliis distantibus e basi ovata amplexicauli longissime subulato-setaceis patulis flexuosis solidinerviis canaliculatis integerrimis, capsula oblonga subobliqua, operculo conico-subulato.—Dicranum flexifolium, *Hook. Musc. Exot. t.* 144. Didymodon angustatus, *Wils. MSS.*

Hab. Northern Island; clay hills: Bay of Islands, *J. D. H., Colenso.*

A change of the specific name is requisite, to avoid confusion.—*Leaves* very similar in form to those of the next species, but more distant and patulous. *Inflorescence* monoicous. *Annulus* distinct. *Capsule* gibbous on one side, suberect, narrower towards the mouth. *Nerve of leaf* predominant above, ill-defined at the base.—Found at the Cape of Good Hope. *Didymodon cirrhifolium*, Mont., from the Neilgherries, is scarcely different.

7. Trichostomum *setosum*, Hook. fil. et Wils.; foliis confertis erecto-patentibus strictis e basi parum dilatata setaceis carinatis integerrimis, nervo lato continuo, capsula oblonga obliqua ore coarctato, operculo conico-subulato. (TAB. LXXXIV. Fig. 6.)

HAB. Northern Island: Bay of Islands, *J. D. H.*, *Colenso*, *Dr. Sinclair*.

Closely allied to the preceding.—*Leaves* more setaceous, crowded, very little dilated below, sharply carinate to the apex, lower ones reddish. *Inflorescence*, etc., as in the preceding.—The same Moss, as we suppose, is found in Chili. A variety with more spreading leaves occurs in New Zealand (*Colenso*), approaching in aspect to *T. laxifolium*.—PLATE LXXXIV. Fig. 6:—1, plant, of *natural size*; 2, immature, and 3, mature capsules; 4, operculum; 5, peristome; 6, leaf; 7, apex of ditto:—*all magnified.*

8. Trichostomum *fuscescens*, Hook. fil. et Wils.; dioicum, tenellum, foliis laxis ligulatis canaliculatis obtusiusculis patentibus arcuato-inflexis siccitate tortilibus, nervo subcontinuo, areolis superne minutissime granulosis subpapillatis, capsula elliptica vix annulata, operculo conico-rostrato, peristomii dentibus scabriusculis membrana basilari connexis. (TAB. LXXXV. Fig. 1.)

HAB. Northern Island: Bay of Islands, with *Bryum duriusculum*, *J. D. H.*

Allied to *T. inflexum*, Br. et Sch., but differing in the peristome and in the obtuse granulated leaves not inflexed at the margin.—PLATE LXXXV. Fig. 1:—1, plants, *natural size*; 2, young capsule; 3, ripe capsule; 4, operculum; 5, calyptra; 6, 7, leaves:—*all magnified.*

Gen. XVIII. DISTICHIUM, *Bruch et Schimp.*

Peristomium simplex. *Dentes* 16, sub oris margine liberi, æquidistantes, lineares seu lineari-lanceolati, articulati, linea media ad basin producta, integri vel pertusi, hic illic bicrures, cruribus incompletis sæpius perforatis. *Capsula* oblonga, annulata. *Operculum* conicum, breve. *Calyptra* cucullata.—Folia *disticha, basi vaginantia, setacea.*

1. Distichium *capillaceum*, Bruch et Sch.; dense cæspitosum, foliis e basi lanceolata vaginante setaceis patentibus solidinerviis canaliculatis subintegris.—*Bryol. Europ.* Swartzia capillacea, *Hedw.* Didymodon capillaceus, *Hook. et Tayl. etc.*

HAB. Middle Island: Otago, *Lyall.*

Barren specimens with leaves much crowded and obscurely distichous, referred here with doubt. If correctly named, it is found all over Europe and North and South America.

Gen. XIX. DIDYMODON, *Bruch et Schimp.*

Peristomium pro capsulæ longitudine breve, simplex. *Dentes* 16, lineari-lanceolati, secus lineam medium integri vel pertusi et bifidi, tenerrimi, fugacissimi. *Capsula*, etc. ut in *Trichostomo.*

The separation of *Didymodon*, as a genus, from *Trichostomum*, seems to be questionable, but according to Bruch and Schimper is characterized as a natural group by the tender fugacious peristome, which resembles that of *Anacalyptra* or of *Dermatodon*, rather than of *Trichostomum*, with which it agrees in habit.

1. Didymodon *papillatus*, Hook. fil. et Wils.; laxe cæspitosus, caule elongato rigidulo subramoso, ramis erectis filiformibus, foliis trifariis patenti-recurvis ovato-lanceolatis acuminulatis carinatis subsolidinerviis integerrimis utrinque papillatis perichætialibus convolutis, capsula oblonga erecta, operculo conico-subulato. (TAB. LXXXV. Fig. 2.)

HAB. Northern Island: Bay of Islands, *J. D. H.*, *Colenso* (barren).

Agreeing with fertile specimens from Swan River, Australia.—*Stems* about an inch long, slender, but rather rigid and brittle. *Leaves* yellowish (reddish in age), distinctly trifarious, when dry erect and subsecund, papillose

at the back and upper surface, margin recurved below, plane above. *Seta* pale. *Capsule* small, contracted at the mouth, twice as long as the operculum; annulus small, indistinct. *Teeth of peristome* sixteen, irregular, sometimes cloven, here and there interlaced. Dioicous?—Owing to the growth of innovations, it is difficult to ascertain the terminal position of the fruit. The species is allied to *D. flexifolius*, Bryol. Europ.—It is found also in South Africa, bearing fruit (*Zeyher*).—PLATE LXXXV. Fig. 2:—1, plant, *natural size;* 2, unripe capsule; 3, stem and leaves; 4, 5, leaves; 6, transverse section of leaves:—*all magnified.*

Gen. XX. CERATODON, *Bridel.*

Peristomium simplex. *Dentes* 16, lanceolati, ad basin fere bicrures, cruribus æqualibus subulatis, basi dense superne remote articulati, articulationibus prominulis, humiditate conniventes, siccitate spiraliter incurvi. *Capsula* suberecta, oblonga, collo brevi, striata, sicca angulosa, pachyderma. *Annulus* duplex, revolubilis. *Operculum* conico-rostratum. *Calyptra* cucullata.—Habitus *inter Dicranoideum et Trichostomoideum ludens.*

This group resembles *Trichostomum* in foliage and mode of growth, but in the peristome and configuration of the capsule is more allied to *Dicranum.*

1. Ceratodon *purpureus*, Brid.; cæspitosus, caule dichotome ramoso, foliis oblongo-lanceolatis margine reflexis carinatis integerrimis dorso papillatis patentibus siccitate subtortilibus laxe incurvis, nervo subexcurrente, perichætialibus vaginantibus acuminatis, capsula oblonga subincurva striata strumulosa siccitate cernua subhorizontali, operculo conico, peristomii dentibus in membrana basilari sat producta bifidis margine pallidioribus.—*Bryol. Univ. v.* 1. *p.* 480. *Bryol. Europ.* Dicranum purpureum, *Hedw.* Didymodon purpureus, *Hook. et Tayl.*

HAB. Throughout the Islands, abundant. (A native of England.)

Common in all parts of the world, and variable in size and aspect, but easily recognized by the elongated, curved, furrowed or angular capsule, with a short struma at the base. Two closely allied species (if not varieties) are indicated by M. Schimper.—*C. stenocarpus*, from the East Indies, and *C. Corsicus*, the latter having the perichætial leaves obtuse, and the teeth of the peristome papillose.

Tribe VI. GRIMMIÆ.

Gen. XXI. SCHISTIDIUM, *Bridel* (*ex parte*), *Bruch et Schimp.*

Peristomium simplex. *Dentes* 16, majusculi, lanceolati, transverse articulati, linea media nulla, superne cribrosi, granulosi, subhygroscopici. *Columella* una-cum operculo delabens. *Capsula* immersa, obovata, macrostoma, lævis, pedicello brevissimo. *Operculum* depresso-convexum, mamillatum vel brevirostellatum. *Annulus* subnullus. *Calyptra* parvula, conica, basi dilatata lacera. *Florescentia* monoica, flos masc. gemmæformis.—Musci *acrocarpi, pulvinato-cæspitosi, perennes, rupincolæ;* foliis *lanceolatis, confertis.*

1. Schistidium *apocarpum*, Bruch et Schimp.; laxe cæspitosum, foliis ex erecta basi patentibus ovato-lanceolatis margine reflexis apiculo hyalino instructis, nervo evanido, perichætialibus latioribus tenuinerviis, capsula elliptica pachyderma (immersa) exannulata.—*Bryol. Europ.* Grimmia apocarpa, *Auctorum.*

Var. 1; foliis apiculo brevissimo obtusiusculis.

Var. 2; foliis muticis angustioribus fusco-luteis. Grimmia alpicola, *Auct.*

HAB. Northern Island. Var. 1. Banks of Waitangi, *J. D. H.* Var. 2. Shores of Waikare Lake, *Colenso.* (A native of England.)

Found also in Europe, and North and South America.

Gen. XXII. GRIMMIA, *Auct.*

Peristomium simplex. *Dentes* 16, majusculi, lanceolati, extus convexiusculi, transverse trabeculati, cribrosi, simplices vel apice bi-trifidi, siccitate patuli vel erecto-recurvi. *Columella* in sporangium recedens. *Capsula* exserta, pedicellata, ovalis oblongave, symmetrica, annulata, lævis vel striata. *Operculum* conico-rostratum vel convexum et mamillatum. *Calyptra* mitræformis, basi quinqueloba, erecta, vel latere fissa et obliqua, infra operculum producta. *Florescentia* monoica vel dioica: fl. masc. gemmæformis.—Musci *perennes, rupestres, nunc pulvinati, nunc cæspitulos compactos irregulares efficientes, præ cæteris monticolæ.* Foliorum *reticulatio densa: areolæ punctiformes, basi elongatæ, diaphanæ, marginem versus quadratæ.*

1. Grimmia *pulvinata,* Hook. et Tayl.; dense pulvinata, foliis lanceolato-oblongis superne carinatis repente piliferis evanidinerviis margine recurvo, capsula in pedicello arcuato demissa ovali striata, calyptra mitræformi, annulo magno, operculo rostrato.—*Muscol. Brit.* Dryptodon, *Brid.* Dicranum, *Schwægr.* Trichostomum, *Web. et Mohr.* Fissidens, *Hedw.*

Var. *β. Africana;* humilior, capsula breviore, operculo conico mamillato brevissimo, dentibus brevioribus.—Fissidens pulvinatus, *var. β.* Africanus, *Hedw. Sp. Musc. t.* 40. G. cygnicolla, *Taylor.*

Hab. Northern Island, *Colenso.* Auckland, *Knight.* (A native of England.)

A native of South Africa, Australia, and Europe; liable, on account of the short operculum, to be confounded with *G. orbicularis,* Bryol. Europ., which is a more delicate Moss, with a dimidiate calyptra and a cribrose peristome.

2. Grimmia *trichophylla,* Grev.; laxe pulvinata, foliis lineari-lanceolatis flexuosis sensim in pilo diaphano sublævi attenuatis siccitate crispulis, capsula in pedicello cygneo subpendula ovali striata siccitate angulosa, operculo conico-rostrato, annulo lato, peristomii dentibus bifidis.—*Greville, Scot. Crypt. Flora, t.* 100. *Hook. et Tayl.*

Hab. Middle Island: Ship Cove and Port Cooper, *Lyall.* (A native of England.)

The gradually tapering leaves readily distinguish this from the preceding species. It is found in Britain, and throughout Europe, Asia Minor, North America, and Chili (*Bertero*).

Gen. XXIII. RACOMITRIUM, *Bridel.*

Peristomium simplex. *Dentes* 16, bi-trifidi, crura nunc filiformia, longissima, ad basin usque libera, nunc breviora, lineari-subulata, inæqualia, irregulariter coalita. *Capsula* in pedicello strictiusculo exserta, elliptica oblongave, lævis, ore angustata, annulata. *Operculum* conico-subulatum. *Calyptra* conico-mitræformis, ad apicem subulata, basi membranacea pluries fissa, apice solido papillosa, operculum tegens.—Florescentia *dioica.* Folia *evanidinervia, carinata, margine recurvo: reticulatio ex areolis superne quadratis vel elongato-sinuosis, inferne longioribus angustis valde sinuosis.* Musci *speciosi, cæspitosi, perennes.* Habitus *a* Grimmioideo *ad* Hypnoideum *transitionem mentiens.* Habitatio *terrestris et rupestris.*

1. Dryptodon.—*Plantæ dichotome ramosæ, innovationibus simplicibus fastigiatis.*

1. Racomitrium (Dryptodon) *crispulus,* Hook. fil. et Wils.; foliis erecto-patentibus subrecurvis ovato-oblongis acuminatis carinatis margine basi reflexo apice subdiaphanis, nervo percurrente, seta perbrevi, capsula elliptico-oblonga, operculo conico-subulato, peristomii dentibus bifidis siccitate reflexis.—*Fl. Antarct. p.* 124. *t.* 57. *f.* 9.

Hab. Northern Island, *Colenso.*

Found also in Campbell's Island and Kerguelen's Land.

2. Racomitrium (Dryptodon) *rupestris,* Hook. fil. et Wils.; foliis patentibus ovato-lanceolatis carinatis

margine recurvo evanidinerviis, seta brevi, capsula elliptico-oblonga pachyderma, operculo conico subulato.—*Fl. Antarct.* 402. *t.* 152. *f.* 1. R. convolutum, *Mont.? Cent.* 5. 58.

HAB. Northern Island, *Colenso.*

Leaves shorter than in the preceding, not piliferous, margin more recurved. *Capsule* larger and of firmer texture, more deeply coloured.—*R. convolutum*, Mont., we have not seen, but it is probably not distinct. *Grimmia didyma*, Mont. Cent. 5. 59, also from Chili, has the margin of the leaf revolute and a different peristome, as described; but the reticulation of the leaf appears to be that of *Racomitrium*.—This is also found at Cape Horn.

3. Racomitrium (Dryptodon) *protensus*, Braun; foliis undique patentibus vel subsecundis elongato-lanceolatis muticis siccitate appressis, perichætialibus subvaginantibus, seta longiore, capsula subcylindrica, dentibus longiusculis irregulariter fissis.—*Bryol. Europ.* R. cataractarum, *Braun, in Bridel Bryol. Univ.* R. aquaticum, *Bridel.*

HAB. Northern Island, *Colenso.* (A native of England.)

Found in Britain and throughout Europe: Hermite Island, Cape Horn, Falkland Islands. A more robust species than the preceding, with leaves more appressed when dry.

2. RACOMITRIUM.—*Plantæ irregulariter ramosæ, ramulis lateralibus brevibus ramosæ, innovationibus haud fastigiatis.*

4. Racomitrium *fasciculare*, Brid.; caule fasciculato-ramoso, ramis subfastigiatis inæqualibus, foliis patenti-recurvis elongato-lanceolatis muticis carinatis margine reflexis areolis omnibus elongato-sinuosis, capsula oblongo-ovali, operculo subulato, calyptra superne papillosa, peristomii dentibus ad basin bifidis, cruribus subæqualibus anguste lineari-subulatis nodosis, annulo latissimo.—*Bryol. Univ. Bryol. Europ.* Trichostomum, *Hedw., Hook. et Tayl.*

Var.; caule gracili, foliis secundis acutis apice subdiaphano serrulato, perichætialibus intimis obtusis vaginantibus, calyptra minore inferne subplicata apice minus papillosa.—R. fasciculare, var. 2, *Fl. Antarct. p.* 402.

HAB. Northern and Middle Islands: Port Nicholson and Bligh's Sound, *Lyall.* (A native of Britain.)

This species is distributed throughout Europe and North America; the *var.* is found at Hermite Island.—The New Zealand specimens have leaves more secund, more acute, and of closer texture than in the variety from Hermite Island. Both have the teeth of the peristome granulose, wider at the base, and more regularly formed than shown in the figure in Bryol. Europ., and the articulations wider apart. The small pale calyptra and blunt sheathing perichætial leaves are remarkable. It may however prove a distinct species. The subplicate calyptra connects *Racomitrium* very closely with *Ptychomitrium* of Bryol. Europ.

5. Racomitrium *lanuginosum*, Brid.; caule elongato ramuloso, foliis erecto-patentibus lanceolatis acuminatis apice hyalino eroso-dentatis et granulosis, capsula minuta ovata in pedicello breviore tuberculoso erecta, dentium bifidorum cruribus filiformibus.—*Bryol. Univ. Bryol. Europ.* Trichostomum, *Hedw. Hook. et Tayl.*

Var. *pruinosum*; foliis valde incanis acumine hyalino longiore argutius spinoso-serrato.

HAB. Northern Island, *Colenso.*

The variety *pruinosum* has not been found in fruit; it may prove to be a distinct species. *Serratures* of the apex of the leaf larger, spinulose, erect, not spreading.—It is found in Great Britain and Europe, North America, Hermite Island, Falkland Island, Tasmania.

Tribe VII. ORTHOTRICHEÆ.

Gen. XXIV. SCHLOTHEIMIA, *Bridel.*

Peristomium duplex: *exterius*, dentes sedecim per paria approximati, extrorsum revoluti: *interius*,

laciniæ sedecim pluresve irregulares, erectæ, in conum conniventes. *Calyptra* conico-mitræformis, apice plus minus scabra papillosave, cæterum lævis, basi appendicibus quatuor pluribusque convergentibus primo ortu introflexis coalitis. *Capsula* subcylindrica, erecta, lævis vel sulcata, exannulata. *Operculum* conico-subulatum.—Folia *multifaria, oblonga, areolis circularibus discretis punctiformibus.* Color *lutescens, brunneus vel ferrugineus, sæpe quasi deustus.* Sedes *in arboribus.* Caulis *repens, surculis erectis, confertis, ut in* Macromitrio.

For remarks on the genus, see Fl. Antarct. p. 126. The calyptra differs essentially from that of *Macromitrium.*

1. Schlotheimia *Brownii*, Schwægr.; foliis lingulatis obtusiusculis cuspidulatis erecto-patentibus laxiusculis siccitate tortilibus, capsula striata, peristomio interno 32-partito, calyptra lævi.—*Schwægr. Suppl.* ii. *p.* 2, 52, 146. *t.* 167. *Bridel, Bryol. Univ.*

Hab. Northern Island: Bay of Islands, *J. D. H.* Port Nicholson, *Lyall.*

Identified by the description only, for we have not compared it with New Holland specimens.—*Stems* more slender than in other allied species. *Leaves* more obtuse than in *S. quadrifida* (Fl. Antarct. p. 126), slightly rugose (but far less so than in *S. nitida* and *S. rugifolia*). *Nerve* narrow, scarcely excurrent into the short apiculus; areolæ more distinct. *Capsule* small, ovate-oblong. Whole plant considerably smaller and more delicate than *S. quadrifida. Male inflorescence* found only in a nidulant, ambiguous state, on a few of the specimens.

Gen. XXV. MACROMITRIUM, *Bridel.*

Peristomium duplex vel simplex, interdum 0: *exterius* intus sub ore capsulæ adnatum, dentes sedecim per paria plus minus approximati, plani, lanceolati: *interius* membrana multifida lacera. *Calyptra* conico-mitræformis, longitudinaliter plicata, sulcatave, basi haud appendiculata, inferne in plures lacinias demum partita, glabra vel pilosa. *Capsula* ovata, basi attenuata, vix apophysata, æqualis, erecta, exannulata, longipedunculata, pachyderma, ore siccitate sæpius plicis octo contracta. *Operculum* rectum, rostratum.—Folia *multifaria, lanceolato-oblonga, areolis minimis circularibus punctiformibus.* Caulis *repens, surculis erectis confertis.*

Macromitrium differs from *Orthotrichum* in the narrow, subulate calyptra, which is not inflated previous to the development of the capsule, in the absence of an apophysis, in the rostrate operculum, and in general habit. The peristome is variable, and in some species apparently wanting. The calyptra varies sometimes in degree of pubescence, hence *Leiotheca*, Bridel, is a very questionable genus.—The group requires careful revision.

a. *Calyptra glabra; peristomium duplex.*

1. Macromitrium *sulcatum*, Hook.; foliis patentibus lineari-lanceolatis subundulatis acuminatis apice denticulatis siccitate crispis tortilibus.—Schlotheimia sulcata, *Hook. Musc. Exot. t.* 156. *Bridel, Bryol. Univ.*

Var. β; foliis minus acuminatis vix undulatis apice subintegris.

Hab. Northern Island, *Colenso.*

One of the largest species of the genus; also found in Ceylon.

b. *Calyptra glabra; peristomium simplex.*

2. Macromitrium *fimbriatum*, P. Beauv.; ramis brevibus, foliis patulis ligulatis obtusis margine subplanis subcrenulatis siccitate crispis involutis laxius areolatis.—Orthotrichum, *P. Beauv. Prodr.* 80. *Brid. Bryol. Univ.* M. uncinatum, *Bridel.*

Hab. Northern Island: Waikehi, *Dr. Sinclair.* Port Nicholson, *Lyall.*

Schwægrichen's figure, etc. (Supp. t. 111) seems to belong rather to *M. mucronifolium*, which frequently grows

intermixed with the specimens from Guadeloupe, of which place this plant is a native, as also of Tristan d'Acunha, Madagascar, and Mauritius.

3. Macromitrium *longirostre*, Hook.; foliis densis lineari-lanceolatis acuminatis bilineatis solidinerviis siccitate tortilibus, seta crassa, capsula ovali sulcata.—Orthotrichum, *Hook. Musc. Exot. t.* 25. *Schwægr. Suppl. t.* 112. *Bridel.*

Var. *β. acutifolium*; foliis magis acuminatis, nervo subexcurrente.—Orthotrichum acutifolium, *Hook. et Grev. Monog. in Brewst. Journ. Sc. v.* 1. *t.* 5.

Hab. Middle Island. Var. *α.* Dusky Bay, *Menzies.* Var. *β.* Port Preservation, *Lyall.*

Remarkable for its thick, rather short seta, and the very acute, subrigid leaves, loosely twisted when dry. —*Branches* about one inch long, erect, crowded.—It is a native of Tasmania, Lord Auckland's Group, Campbell's Island, and South America.

4. Macromitrium *longipes*, Hook.; ramis erectis elongatis, foliis densis erecto-patentibus strictis lineari-lanceolatis acutiusculis siccitate crispato-tortilibus, pedunculis longissimis, capsula elliptica siccitate ore plicato contracta.—Orthotrichum, *Hook. Musc. Exot. t.* 24. *Schwægr. Suppl. t.* 139.

Var. *β*; caule graciliore, foliis laxioribus, pedunculis brevioribus.

Var. *γ*; foliis ligulato-lanceolatis obtusiusculis apiculatis.

Var. *ε*; foliis patulo-incurvis ligulato-lanceolatis, capsula minore.

Hab. Northern and Middle Islands: Dusky Bay, *Menzies.* Chalky Bay and Milford Sound, *Lyall.* Bay of Islands; on trunks of the Kaudi Pine, rare, *J. D. H.* Var. *β.* Stewart's Island, *Lyall.* Var. *γ.* Auckland, *Sinclair.* Var. *ε.* Milford Sound, *Lyall.*

Variable, especially in the aspect of the dried foliage, which in some specimens is more closely contorted, in others lax and more crisped; in var. *ε*, which approaches in aspect to *M. Reinwardtii*, the leaves in a moist state very much resemble those of *M. incurvifolium*, but the areolation is minutely punctate, and the seta is long.—Nidulant male flowers have been observed in some of the specimens.

5. Macromitrium *gracile*, Hook.; caule gracili elongato flexuoso subramoso erecto, foliis patulo-incurvis (fragilibus) lanceolato-subulatis e nervo percurrente cuspidatis siccitate flexuosis tortilibus, seta brevi, capsula ovata siccitate striata.—Orthotrichum, *Hook. Musc. Exot. t.* 27. *Schwægr. Suppl. t.* 112.

Hab. Northern and Middle Islands: Dusky Bay, *Menzies.* Chalky Bay, *Lyall.* Trunks of trees, Waikehi, *Dr. Sinclair.*

Known by the subulato-setaceous terminations of the leaves, and the short setæ.—*Stems* often two inches long. —In a younger state the aspect of the dried specimens much resembles that of *M. recurvifolium*, but the leaves are different in shape.

c. *Calyptra pilosa.*

6. Macromitrium *recurvifolium*, Hook. et Grev.; foliis patulis subrecurvis lanceolato-subulatis obtusiusculis siccitate crispatis spiraliter contortis, capsula ovato-oblonga leviter sulcata.—Orthotrichum recurvifolium, *Hook. et Grev. l. c. t.* 5. *Bridel, Bryol. Univ.*

Hab. Northern Island: Bay of Islands, *J. D. H., Colenso, etc.*

The foliage of this, when moist, is remarkably spreading.—*Leaves* short, fragile, subulate and obtuse in the upper half, reticulation dense and opaque, areolæ very small.—Found also in Java.

7. Macromitrium *Mauritianum*, Schwægr.; foliis patentibus incurvis lanceolato-acuminatis dense areolatis nervo pallido siccitate crispato-tortilibus, seta brevi, capsula urceolata lævi, calyptra subpilosa.—*Schwægr. Suppl. t.* 189.

Hab. Northern Island: Bay of Islands, *Logan.*

Leaves longer and more gradually tapering than in the preceding, less spreading when wet, and usually more crisped when dry, approaching in character, but not in size, to *Orthotrichum subtortum*, Hook. et Grev. Male flowers nidulant.—It inhabits Mauritius, Java, and New Holland.

8. Macromitrium *incurvifolium*, Hook. et Grev.; foliis patulo-incurvis lanceolato-subulatis acutiusculis carinatis siccitate crispatis, capsula ovata lævi.—*Hook. et Grev. l. c. t.* 4. Orthotrichum serpens? *Hook. et Grev. l. c. t.* 5. Macromitrium subtile? *Schwægr. Suppl. t.* 192.

Hab. Middle Island: Dusky Bay, *Menzies.*

Peristome absent in the New Zealand specimens.—In *Orthotrichum serpens*, the capsule appears to be striated, and a single peristome has been observed by Hooker and Greville. The remaining specimens are inadequate to confirm the fact: in other respects they agree with *M. incurvifolium.* Mr. Menzies' tickets being sometimes misplaced, it is possible that this Moss, which is found in New Holland, the Society Islands, Ternate, Pitcairn's Island, and the Cape of Good Hope? may have got by mistake into the New Zealand collection.

9. Macromitrium *hemitrichodes*, Schwægr.; foliis patulis subincurvis ligulato-lanceolatis obtusis apiculatis siccitate crispatis densissime areolatis, capsula oblonga lævi apice plicato, calyptra subpilosa.—*Schwægr. Suppl. t.* 193.

Hab. Northern Island, *Logan.*

The areolation of this species is very minute and subopaque, very different from that of *M. incurvifolium.* The capsule is sometimes oval, at other times subcylindrical. The foliage has a darker hue than that of the allied species. —Also found in New Holland.

10. Macromitrium *microstomum*, Hook. et Grev.; foliis patulis subincurvis ligulato-lanceolatis obtusis apiculatis papillosis siccitate crispatis laxe areolatis nervo rubello, capsula ovali lævi apice plicato, calyptra pilosiuscula.—*Hook. et Grev. l. c. p.* 114. *t.* 4.

Hab. Middle Island: near Nelson, *Bidwill.*

The papillose leaves, with larger roundish areolæ than in the allied species, are distinctive marks. Colour of the foliage yellowish.—A Tasmanian species.

11. Macromitrium *prorepens*, Hook.; ramis brevibus, foliis erecto-patentibus ligulato-lanceolatis obtusis apiculatis dorso carinatis siccitate vix crispatulis, capsula ovali, ore subplicato, calyptra pilosa.—*Hook. et Grev. l. c. p.* 116. *Musc. Exot. t.* 120.

Hab. Northern and Middle Islands: Dusky Bay, *Menzies.* On trees, Waikehi, *Sinclair.* Milford Sound, *Lyall.*

Closely allied to *M. microstomum.*—*Leaves* less spreading when wet, less crisped when dry. *Areolæ* somewhat smaller and less papillose.—It has been gathered in Oahu.

12. Macromitrium *piliferum*, Schwægr.; foliis confertis patentibus lanceolato-subulatis piliferis siccitate crispato-tortilibus dense areolatis, capsula ovato-oblonga superne plicata, calyptra pilosa.—*Schwægr. Suppl. t.* 172.

Hab. Middle Island: Dusky Bay, *Menzies.*

Here again we venture to suggest the possibility of a false habitat, several of Mr. Menzies' South Sea Island plants having been erroneously ticketed as New Zealanders, and *vice versâ.* This is a Sandwich Island plant.

13. Macromitrium *retusum*, Hook. fil. et Wils.: foliis erecto-patentibus confertis ligulato-lanceolatis retusis (apice fere bilobis) inferioribus sensim acuminatis siccitate crispulis. (Tab. LXXXV. Fig. 6.)

Hab. Northern Island, *Colenso.*

A few barren specimens only: remarkable for the retuse apices of the leaves, reticulation minutely punctate.—

Plate LXXXV. Fig. 6:—1, plant, *natural size*; 2, portion of stem and leaves; 3, 4, leaves; 5, apex of leaf; 6, transverse section of leaf:—*all but fig.* 1 *magnified.*

14. Macromitrium *microphyllum*, Hook. et Grev.; ramis filiformibus, foliis ovato-lanceolatis patentibus basi carinatis bistriatis pellucidis siccitate strictis appressis, capsula ovali-oblonga subpyriformi leviter sulcata, peristomio brevissimo indiviso.—*Hook. et Grev. l. c. p.* 121. *t.* 6.

Hab. Northern and Middle Islands: Port Nicholson, *Lyall.* East Coast, *Colenso.*

A South African species, nearly allied to *M. tenue.* Leaves more lax and spreading (recurved in Colenso's specimens), shorter, and more ovate, upper surface more or less papillose; areolæ guttulate, vaginula hairy; perichætial leaves ovate-acuminate. Calyptra hairy.—*M. Dregei*, Hornschuch, appears to be this species.

Gen. XXVI. ORTHOTRICHUM, *Hedwig.*

Peristomium duplex vel simplex, rarius 0: *exterius* intus sub capsulæ ore adnatum, dentes 16, plerumque per paria connati, hygroscopici, siccitate erecti, patentes vel reflexi: *interius* nunc cilia 8 v. 16. *Capsula* immersa vel exserta, erecta, pyriformis, collo plus minus elongato, striata (striæ cum dentibus alternantes), siccitate costata exannulata. *Operculum* conico-rostellatum. *Calyptra* magna, campanulata, plicata, basi crenato-lacera, in plurimis recte-pilosa. *Florescentia* plerumque monoica: flos masc. gemmæformis.—Caules *pulvinati, subrepentes.*

1. Orthotrichum *calvum*, Hook. fil. et Wils.; caule humili gracili, foliis patentibus ex ovata basi lanceolato-subulatis obtusiusculis siccitate laxis suberectis, capsula exserta elliptico-oblonga vel clavata striata, calyptra glabra, vaginula pilosa. (Tab. LXXXV. Fig. 7.)

Hab. Northern Island: branches of trees, Manawatu, *Colenso.*

A small species, approaching *O. pulchellum* in aspect, about three lines in height.—*Seta* a little longer than the capsule. *Inner peristome* with eight cilia. *Calyptra* yellowish-brown, quite glabrous. *Operculum* absent.—Plate LXXXV. Fig. 7:—1, plants, *natural size*; 2, plant, *magnified*; 3, capsule; 4, leaves:—*all but fig.* 1 *magnified.*

2. Orthotrichum *pumilum*, Schwægr.; caule humili, foliis patentibus siccitate imbricatis lanceolatis obtusiusculis concavis, capsula ovata brevicolla late striata immersa, operculo conico brevi.—*Var.* Calyptra pilosa, *Schwægr. Suppl. t.* 50. *Bryol. Europ. Smith, Eng. Bot. t.* 2168.

Hab. Northern Island: cliffs at Hawke's Bay, *Colenso.* (Native of England.)

A common European plant. Specimens few and imperfect.

Gen. XXVII. ZYGODON, *Hook.*

Peristomium duplex, simplex, vel 0: *exterius*, dentes 16 per paria connexi, plani, siccitate patuli vel reflexi; *interius*, cilia 8–16, cum dentibus alternantia, linearia, hyalina, horizontalia. *Capsula* erecta, clavato-pyriformis, striata, pedicellata vel immersa, exannulata. *Operculum* oblique rostratum. *Calyptra* cuculliformis, obliqua.

1. Zygodon *obtusifolius*, Hook.; monoicus, foliis laxis erecto-patentibus ligulatis obtusis, peristomio duplici.—*Musc. Exot. t.* 159. *Schwægr. Suppl. t.* 136.

Hab. Northern Island: Bay of Islands, *J. D. H., Colenso.*

Cilia of the inner peristome eight. *Calyptra* roughish above, subplicate below; as in all other species of this genus reddish-brown. *Capsule* with eight broad ribs, furrowed when dry.—An East Indian species.

2. Zygodon *intermedius*, Br. et Schimp.; dioicus, caule gracilescente elatiore subramoso, foliis laxis

erecto-patentibus lanceolato-lingulatis acutiusculis, peristomio simplici interno 8-ciliato.—Zygodon conoideus, β elongatus, *Hook. et Grev. in Brewst. Journ. Science.*

HAB. Middle Island: Dusky Bay, *Menzies.*

Also found in Tasmania; and in Chili (*fide Montagne*).

3. Zygodon *Brownii*, Schwægr.; dioicus, caule ramoso fastigiato, foliis oblongis acutis squarrosis, peristomio duplici.—*Schwægr. Suppl. t.* 317 *b.*

HAB. Throughout the Islands: Auckland and Port Nicholson, *Sinclair.* Milford Sound, *Lyall.*

Leaves broader than in the preceding, widely spreading and recurved, lax, and slightly crisped when dry. *Outer peristome* often rudimentary or irregular. *Cilia* eight.—Also a Tasmanian species.

4. Zygodon *Reinwardtii*, Braun; foliis lanceolato-oblongis dentatis patentibus margine undulatis, florescentia hermaphrodita. Var. β. foliis minus dentatis subintegris.—*Schwægr. Suppl. t.* 312 *a.* Zygodon denticulatus, *Taylor, in Lond. Journ. Bot. v.* 6. *p.* 329.

HAB. Northern Island: Port Nicholson, *Sinclair.* Ruahine Mountains, *Colenso.*

A native of Java and South America. Peristome absent in this variety; in the Java specimens an inner peristome of sixteen cilia has been observed.

5. Zygodon *cyathicarpus*, Mont.; monoicus, foliis patentibus subrecurvis lineari-lanceolatis acutis carinatis siccitate crispato-tortuosis, perichætialibus capsulam superantibus, seta perbrevi, capsula cyathiformi gymnostoma striata, operculo convexo oblique rostellato.—*Montagne, in Ann. Sc. Nat. Cent.* 5. *p.* 30. Gymnostomum linearifolium, *Taylor in Lond. Journ. Bot. v.* 5. *p.* 42.

HAB. Northern Island: Makororo River, *Colenso;* mixed with *Bartramia uncinata.*

Closely allied to *Z. Mougeotii*, Bryol. Europ.; but distinguished by the more linear leaves and monoicous inflorescence.—A native of the Andes of Chili and Columbia.

Tribe VIII. BRYACEÆ.

Gen. XXVIII. ORTHODONTIUM, *Schwægr.*

Peristomium duplex, infra capsulæ orificium oriens: *exterius, dentes* 16, lanceolato-subulati, siccitate infra orificium capsulæ sæpe inflexi: *internum*, cilia 16, dentibus alternantibus, e basi brevi subcarinata dilatata, filiformia. *Capsula* clavato-pyriformis, in pedicello tenui suberecta vel cernua, exannulata, symmetrica, e membrana tenui laxe areolata. *Operculum* breve, conico-rostellatum. *Calyptra* parvula, cuculliformis, fugax.—Florescentia *monoica: fl. masc. gemmæformes, axillares, sæpius aggregati.* Folia *longiuscula, lineari-lanceolata, tenuia, laxe areolata, areolis subparallelogrammis, evanidinerviis.* Musci *rupestres, graciles, cæspitosi, habitu* Bryis angustifoliis *affines.*

1. Orthodontium *sulcatum*, Hook. et Wils.; foliis patenti-recurvis lineari-lanceolatis subplanis evanidinerviis, capsula elliptico-oblonga brevicolla siccitate sulcata inclinata.—*Hook. Ic. Pl. t.* 739 *B.*

HAB. Middle Island: Port William, *Lyall.*

An Australian species, nearly 1 inch long. Differs in the furrowed capsule from others of the genus.—*Inner peristome* with carinate segments, as long as the outer teeth, united below by a common membrane, and thus approaching very closely to the usual structure of *Bryum. Operculum* very shortly and obliquely rostellate. The furrowed capsule resembles that of *Zygodon. Inflorescence* occasionally hermaphrodite, usually monoicous; male flowers axillary, sometimes terminal on a branch, as shown in *O. lineare*, Schwægr. Suppl. t. 188.—*Weissia linearifolia*, Schw. (Suppl. t. 179), seems to be nearly allied, and may prove to belong to this genus, though said to be dioicous.

Gen. XXIX. LEPTOSTOMUM, *R. Brown.*

Peristomium simplex, membranaceum, demum annulare, subdivisum, e membrana interiore (sporangio) ortum. *Capsula* clavato-pyriformis, suberecta vel cernua, longipedunculata. *Operculum* brevissimum, subconicum. *Calyptra* cucullata.—Florescentia *dioica: fl. mas. terminales, capituliformes.* Caules *dense cæspitosi, radiculoso-tomentosi.* Folia *ovato-lanceolata, pilifera, crassinervia, areolis circularibus.*

The single peristome of *Leptostomum*, as is well observed by Schwægrichen, is quite analogous to the inner one of *Brachymenium*, from which genus *Leptostomum* chiefly differs in wanting the outer peristome (reduced to a mere rudimentary border), in the rudimentary annulus, in the piliferous leaves, and in the areolation, which is nearly as in *Aulacomnion*, to which genus it also approaches in the structure of the male flowers.

1. Leptostomum *gracile,* R. Br.; caule subramoso, foliis erecto-patentibus confertis oblongis acutiusculis inferioribus ovato-lanceolatis omnibus piliferis crassinerviis margine recurvo siccitate erectis appressis, capsula oblonga subclavata inclinata, operculo hemisphærico.—*R. Brown, Linn. Trans. v.* 10. *p.* 321. *Schwægr. Suppl. t.* 104. Gymnostomum gracile, *Hook. Musc. Exot. t.* 22.

Var. *β*; capsula subcylindrica erecta superne angustata.

Hab. Throughout the Islands: Dusky Bay, *Menzies.* Bay of Islands, *J. D. H.* Milford Sound, *Lyall.* Var. *β*. Wangarei Bay, *Colenso.*

Stems 2–3 inches high. *Seta* in Lyall's specimens 2 inches long. *Leaves* less obtuse than in *L. inclinans*, erect, and closely imbricated when dry, margin more closely reflexed, hair-points usually straight (not wavy); areolation closer and smaller; nerve stronger and more opaque. *Peristome* a membranous white annulus, with evident traces of division into sixteen bifid segments, as in *Brachymenium. Annulus* persistent, obscure. *Spores* rather large, yellowish, papillose.—The nerve of the leaf is composed of distinct woody tissue, with a central open canal.

2. Leptostomum *inclinans,* R. Br.; foliis erecto-patentibus laxius imbricatis ovato-oblongis obtusis piliferis siccitate erectis margine reflexis, capsula inclinata obovato-clavata, operculo conico-hemisphærico.—*R. Brown, l. c. t.* 23. *Schwægr. Suppl. t.* 213. Gymnostomum inclinans, *Hook. Musc. Exot. t.* 168.

Hab. Northern Islands: Huiarau and Ruahamanga River, *Colenso.*

A native of Tasmania.—*Leaves* more obtuse than in the preceding; hair-points wavy, longer, thinner, and diaphanous, apex more evidently denticulate, margin less closely recurved, nerve paler, areolæ larger and coarser. *Capsule* larger, more ventricose, pale buff or yellowish, smooth. *Peristome* as in the preceding, more evidently divided than shown in Schwægrichen's figure. *Spores* ferruginous, papillose.

3. Leptostomum *macrocarpon,* Hedw.; foliis elliptico-oblongis subobovatis concavis margine revolutis pilo ramoso terminatis, capsula erecta ovato-oblonga microstoma, operculo obtuse conico.—Bryum macrocarpon, *Hedw. Musc. Frond. v.* 3. *t.* 10. Leptostomum, *Schwægr., Bridel.*

Var. *β*; caule setaque longioribus, foliis laxioribus margine minus revolutis.

Hab. Common throughout the Islands; forming large tufts on rocks near the sea, and on trunks of trees. Var. *β*. Port William and Jackson's Bay, *Lyall.*

A Tasmanian and New Holland plant, also said to be found in Tahiti.—*Leaves* of softer texture than in the preceding, opaque, with larger hexagonal areolæ; margin distinctly revolute; nerve thinner, the excurrent part curiously branched, especially on the upper leaves. *Capsule* large, erect, not attenuated at the base. *Peristome* smaller than in the preceding, but of the same structure.—*L. erectum*, R. Brown, is nearly allied to this, but has the hair-points simple.

Gen. XXX. BRYUM, *Dillen.*

Peristomium duplex: *exterius, dentes* 16, æquidistantes, simplices, lanceolati, dorso linea longitudinali

exarati, intus transversim lamellati, valde hygroscopici, sicci incurvi: *interius*, membrana in processus 16 carinatos cum dentibus alternantes fissa, ciliis filiformibus interjectis dentibus oppositis, vel nullis. *Capsula* pyriformis vel clavata, pendula vel inclinata, collo brevissimo v. elongato, plerumque annulata. *Operculum* convexum, apiculatum, breve.—Florescentia *dioica, monoica, vel hermaphrodita: antheridia paraphysibus filiformibus immixta.* Folia *ovata, lanceolata, plerumque integra, costata, cellulis rhomboideis.* Caules *perennes, cæspitosi, versus apicem innovationibus simplicibus cauli similibus proliferi.*

1. Bryum *tenuifolium*, Hook. fil. et Wils.; caule humili simplici, foliis erectis subsecundis lanceolato-subulatis acuminatis integerrimis soldinerviis margine reflexis, perichætialibus longioribus attenuatis, capsula subpendula oblonga curvula basi obconica, operculo conico. (Tab. LXXXV. Fig. 5.)

Hab. Northern Island: Bay of Islands; on clay banks, *Colenso, J. D. H.*

Var *β. exiguum;* foliis laxioribus brevioribus, capsula breviore, ciliis peristomii interioris abortivis.

Var. *γ*; caule brevissimo, foliis falcato-secundis confertis, capsula brevi, ciliis peristomii interni brevibus.

Dioicous. Allied to the European *B. acuminatum*, but only half the size, about ½ inch long.—*Leaves* pale, more attenuated, their reticulation more lax and pellucid, apex entire, colour shining yellowish-green; nerve somewhat excurrent; seta pale.—*B. humile*, Mont. (Annal. Sc. Nat. 1845, Cent. 5. 26 *bis*) from Chili, appears to be most closely allied, if not the same as this. In ours the cilia of the inner peristome are inconstant, and the capsule is either curved or straight and symmetrical.—Plate LXXXV. Fig. 5:—1, plants, *nat. size;* 2, plant, *magnified;* 3, capsule; 4, portion of peristome; 5, leaf:—*all magnified.*

2. Bryum *Wahlenbergii*, Schwægr.; dioicum, foliis ovato-acuminatis concavis evanidinerviis pellucidis laxe reticulatis apice subserratis, capsula pendula brevi-pyriformi exannulata.—*Schwægr. Suppl. t.* 70. *Fl. Antarct. pp.* 134, 414. B. albicans, *Auctorum.*

Hab. Stewart's Island, *Lyall;* male plant only. (Native of England.)

Found also in Britain, Europe, North America, Cape Horn, and the Antarctic Islands.

3. Bryum *argenteum*, Linn.; dioicum, foliis imbricatis late ovalibus apiculatis concavis laxe areolatis integerrimis seminerviis albido-sericeis, capsula pendula ex ovali-oblonga.

Var. *γ. lanatum;* foliis longius acuminatis omnino argenteis.—*Bruch et Schimp. Bryol. Europ. Bridel, Bryol. Univ. Fl. Antarct. p.* 413.

Hab. Middle Island, *Lyall;* a scrap only, with *Leptostomum macrocarpum.* (Native of England.)

Easily recognized by its silvery-white foliage. A small species, with blood-red capsules. It is found throughout Europe, North and South America, and the Antarctic Islands.

4. Bryum *blandum*, Hook. fil. et Wils.; dioicum, foliis erecto-patentibus imbricatis ovali-oblongis obtusis concavis integerrimis laxe reticulatis nervo tenui subcontinuo, capsula clavato-pyriformi cernua.—*Fl. Antarct. p.* 134. *t.* 60. *f.* 1.

Var. *β. luridum;* foliis luridis laxioribus patentibus, areolis brevioribus latioribus.

Hab. Northern Island: Makororo river, *Colenso.* Var. *β.* Bay of Islands, *J. D. H.*

Fertile stems more robust than the barren ones figured in 'Flora Antarctica,' about 1 inch in height. *Leaves* reddish, membranous and pellucid, erect and imbricated when dry; nerve reddish. *Seta* nearly 1 inch in length.—Only old capsules have been seen.

5. Bryum *crassinerve*, Hook. fil. et Wils.; dioicum, foliis erecto-patentibus ellipticis obtusiusculis concavis subcoriaceis apice subrecurvis subserrulatis solidinerviis margine reflexis siccitate erectis crispulis, capsula pendula subpyriformi, operculo conico.—B. lævigatum, var.? *Fl. Antarct. p.* 415. *t.* 154. *f.* 3.

Hab. Northern Island: Auckland, *Sinclair*, with *B. Billardieri.*

Somewhat smaller than the Tasmanian specimens of *B. lævigatum*, differing also in the recurved serrulate apex and the distinctly recurved margin of the leaf, which also differs slightly in texture. The stem is, as in that, tomentose, with purplish radicles.—A native of Fuegia and Kerguelen's Land.

6. Bryum *clavatum*, Hook. fil. et Wils.; dioicum, foliis erecto-patentibus incurvis elliptico-lanceolatis subcoriaceis concavis nervo crasso excurrente cuspidulatis, seta breviuscula, capsula clavato-oblonga arcuata majuscula subpendula, operculo subconico. (Tab. LXXXV. Fig. 3.)

Var. β. *extenuatum*; foliis patentibus vix incurvis, capsula elongata minus pendula, seta longiore.

Var. γ; capsula elongata suberecta, peristomio interno dentibus adnato.

Hab. Northern Island: Bay of Islands, *Logan*. Cape Turnagain, *Colenso*. Var. β. East Cape, *Sinclair*. Var. γ. Manawatu river, *Colenso*.

The typical specimens have a peculiar aspect; they are about half an inch in height.—*Stems* tomentose, with brown radicles. *Leaves* singularly curved along the back as seen in profile, not much changed by drying, firm and subopaque. *Seta* short, scarcely ⅓ inch long, reddish, stout, arcuate at top. *Capsule* large, arcuate and pendulous, almost as in *B. demissum*, reddish-brown, of firm texture, tapering into the seta. *Operculum* small, conical, obtuse. *Inner peristome* with cilia.—The two varieties with elongated capsules and longer setæ are referred here with some doubt, but the materials are too imperfect to warrant their separation. *B. apiculatum*, Schwægr. (Suppl. t. 72, et Herb. Arnott), from Isle de France, differs from *B. clavatum* in the more loosely reticulated leaves and smaller capsule, resembling *B. cellulare*, Hook. (Schwægr. Suppl. t. 214), and *B. pachypoma*, Mont. (Cent. 5, 27). *B. nitens*, Hook., is also nearly allied.—Plate LXXXV. Fig. 3:—1, plant, *nat. size*; 2, capsule, and 3, leaves, *magnified*; 4, var. β, *nat. size*; 5, its capsule, *magnified*.

7. Bryum *annulatum*, Hook. fil. et Wils.; dioicum, foliis patentibus subrigidis ovato-lanceolatis concavis acutis integerrimis soldinerviis, capsula pendula ovata.—*Flor. Antarct. p.* 134. *t.* 60. *f.* 2.

Hab. Northern Island: clay banks, Manawatu river, *Colenso*.

Resembling *B. Funkii*, Schwægr. (Suppl. t. 29), but smaller, and the leaves less closely imbricated when dry. The New Zealand specimens are so scanty and imperfect that they cannot with certainty be determined, and this is unfortunately the case with those from Campbell's Island, the only other place where it has been found.

8. Bryum *duriusculum*, Hook. fil. et Wils.; dioicum, foliis erecto-patentibus elliptico-lanceolatis rigidulis concavis nervo valido excurrente cuspidatis siccitate erectis, capsula pyriformi-oblonga cernua, operculo conico-apiculato.

Var. β; foliis minoribus confertis nervo vix excurrente, seta capsulaque brevioribus.

Var. γ; surculis setaque longioribus, foliis distantibus patentibus lanceolatis.

Hab. Northern and Middle Islands: Bay of Islands, *J. D. H.* Dusky Bay, Hutt Valley, and Auckland, *Lyall, Colenso*.

Perhaps only a variety or state of *B. sanguineum*, Bridel (Bryol. Univ. 1. 671; *B. erythrocarpon*, Bruch et Schimp. Bryol. Europ.), having the same deep red capsule and seta, and the lower leaves tinged with the same colour; but the leaves are of firmer texture, not tapering from the middle upwards, and the nerve is stronger and more excurrent. Several forms of the species, if it be such, seem to exist in the collections, of which the var. γ has a seta two inches long, slender, and approaches in aspect the following.

9. Bryum *creberrimum*, Tayl.; dioicum, surculis longioribus, foliis suberectis laxis lanceolatis acuminatis integerrimis margine subreflexis subcarinatis siccitate flexuosis tortilibus erectis nervo tenui excurrente subpiliferis, seta longissima, capsula nutante subcylindrica, operculo convexo mamillato.—*Taylor, in Lond. Journ. Bot.* 1846. *p.* 54.

Hab. Northern Island: Bay of Islands, *Dr. Sinclair*.

Also found at the Swan River. A larger species than the last, 2 inches high; leaves of looser texture, shrink-

ing much when dry, and slightly twisted, the excurrent portion of the nerve very thin. *Capsule* elongated, more or less pendulous.—In size our Moss resembles *B. australe,* Hampe, Ic. Musc. Nov. t. 26, from Swan River; but the magnified figure of the leaves, and frequently erect capsules of the latter, disagree.

10. Bryum *obconicum,* Hornsch.; dioicum, foliis erecto-patentibus oblongo-ovatis acuminatis nervo excurrente cuspidatis submarginatis apice serrulatis siccitate vix tortilibus margine reflexis subcarinatis, capsula subpendula longicolla clavata, operculo convexo mamillato.—*Bruch et Schimp. Bryol. Europ.*

HAB. Northern Island: Auckland, *Sinclair.* (A native of England.)

Resembling the last in size.—*Leaves* of coarser texture, somewhat cartilaginous in the margin. *Capsule* curved, larger and more clavate, tapering more gradually into the seta, which is curved at the top; nerve of the leaf thicker, opaque, spinulose at the apex.—A common European plant.

11. Bryum *atropurpureum,* Web. et Mohr; humile, dioicum, foliis erecto-patentibus ovatis acuminatis concavis integerrimis nervo excurrente cuspidatis siccitate erectis imbricatis margine reflexis, capsula ovali-oblonga nutante, operculo ore constricto latiore convexo mamillato.—*Bryol. Europ.* B. erythrocarpon, *Bridel.*

HAB. Northern Island: Bay of Islands; on clay banks, *J. D. H.* (A native of England.)

A small species, with capsules almost acorn-shaped, dark red when fully ripe. Probably *B. balanoides,* Taylor, from Swan River, Australia, is only a form of this species, and the following is also closely allied. It is found in all Europe, Algiers, Arabia, Smyrna, Australia, and the Cape of Good Hope.

12. Bryum *dichotomum,* Hedw.; "foliis ovato-lanceolatis apiculatis imbricatis, sporangiis ovatis subpendulis."—*Hedw. Sp. Musc. p.* 183. *t.* 44.

HAB. New Zealand, *Herb. Hook.*

The specimen in Herb. Hook. has the capsules shorter than in the preceding, and it also bears slender, repeatedly forked innovations, almost as tall as the fruit-stalk, but there seems no essential difference in the leaves. Inflorescence dioicous. *B. bulbillosum,* Mont. (Cent. 2. 92), from Brazil, appears to be an intermediate form between this and *B. atropurpureum.*

13. Bryum *flaccidum,* Bridel?; "foliis laxiusculis subflaccidis oblongo-ovatis obtusiusculis serrulatis nervo excurrente breviter cuspidatis, theca elongata pendula."—*Bryol. Europ. v.* 1. *p.* 667. B. cæspititium, var. laxum, *Wils. in Gardn. Musc. Brasil. No.* 36.

HAB. Northern Island: Bay of Islands; on damp rocks, rare, *J. D. H.*

The leaves in our specimens are elliptic-oblong, entire, not serrulate. Differs from *B. duriusculum* in the broader, flaccid foliage, and pale capsule. It is smaller than the usual form of *B. cæspititium* of Britain, which has leaves tapering from the middle upwards. Inflorescence dioicous.—Found also in Brazil and Hispaniola.

14. Bryum *varium,* Hook. fil. et Wils.; foliis inferioribus ovato-oblongis concavis obtusis cymbiformibus evanidinerviis, superioribus ovato-acuminatis excurrentinerviis margine recurvis integerrimis siccitate appressis. (TAB. LXXXV. Fig. 4.)

HAB. Middle Island, *Lyall;* barren stems only.

The remarkable aspect of this renders it desirable to indicate it briefly as above. It was growing with *B. duriusculum,* and is a more robust species, with stems nearly 1 inch long.—PLATE LXXXV. Fig. 4:—1, plant, *nat. size;* 2, 3, leaves, *magnified.*

15. Bryum *bimum,* Schreb.; hermaphroditum, foliis patentibus ovato-lanceolatis carinatis margine reflexis nervo excurrente mucronatis siccitate subtortilibus, capsula pendula obovato-pyriformi, operculo majusculo convexo mamillato.—*Bruch et Schimp. Bryol. Europ. Fl. Antarct. p.* 413.

Hab. Northern Island; in marshes, with *Hypnum nodiflorum:* Hawke's Bay, *Colenso.* (A native of England.)

A common European plant, also found in Kerguelen's Land.—A larger species than the last. *Seta* 2 inches long; *capsule* larger, distinguished from all the preceding by the mixture of antheridia with the archegonia (pistilla) in the same flower.

16. Bryum *crassum,* Hook. fil. et Wils.; dioicum, caule longiusculo rigidulo ramoso tomentoso, ramis apice tumidis inferne foliis minutis squamæformibus vestitis, foliis erectis arcte imbricatis concavis ovato-oblongis coriaceis acutis solidinerviis margine reflexis apice subintegris, capsula pendula oblongo-pyriformi, operculo conico-apiculato. (Tab. LXXXVI. Fig. 1.)

Hab. Northern Island: scoriæ at Manukau Bay, west coast, *Colenso.*

This belongs to the small group with rosulate leaves at the summit of the innovations; but here they do not spread, and when dry are very closely imbricated and substriate. Specimens about an inch in height *Capsule* rather small, reddish-brown.—In the aspect of the dry foliage it is very different from *B. lævigatum,* to which it is otherwise allied.—Plate LXXXVI. Fig. 1:—1, plant, *nat. size;* 2, capsule; 3, leaf:—*both magnified.*

17. Bryum *campylothecium,* Taylor; dioicum, caule ramoso tomentoso, foliis erecto-patentibus superioribus in rosulam congestis siccitate appressis obovato-oblongis acutiusculis concavis margine reflexis apice subserratis nervo valido excurrente longe cuspidatis, capsula pendula ex apophysi obconica angustiore ovato-oblonga subventricosa curvula, operculo conico-mamillato.—*Taylor, in Lond. Journ. Bot.* 1846, *p.* 52.

Hab. Northern Island, *Colenso.* Auckland, *Sinclair.*

Found also in Tasmania and Australia.—*Stems* 1½ inch high. *Leaves* of firm texture, scarcely altered when dry, sometimes slightly undulated, yellowish; apex minutely serrulate; nerve excurrent into a long bristly point, pale yellowish. *Bryum Canariense,* Bridel (Schwægr. Suppl. t. 214), is very closely allied, and may be only a variety with the nerve less excurrent. *B. Billardieri,* Bruch et Schimp. Bryol. Europ., appears to belong to *B. Canariense,* and not to the following.

18. Bryum *Billardieri,* Schwægr.; dioicum, foliis superioribus in rosulam congestis patentibus apice recurvis siccitate crispato-undulatis erectis obovato-oblongis acutiusculis immarginatis apice serratis nervo subexcurrente apiculatis margine inferne reflexis, seta crassiuscula apice in collo arcuato capsulæ subito desinente, capsula nutante clavato-pyriformi arcuata, operculo subconico.—*Schwægr. Suppl. t.* 76, *non Bruch et Schimp. Fl. Antarct. p.* 413.

Var. β. *patens;* foliis patulis laxioribus luridis obtusiusculis.

Hab. Northern Island, *Colenso.* Auckland, *Sinclair.* Var. β. Bay of Islands; on damp rocks and banks near the spray of waterfalls, *J. D. H.*

The var. β is considerably altered in appearance by growing in wet places, among gravel.—*Leaves* more scattered and not obviously crowded into terminal tufts.—The species is found in New Belgium, Tasmania, South Africa, Australia, Falkland Islands, and South America.

19. Bryum *truncorum,* Bory St. Vinc.; dioicum, caule elongato, foliis terminalibus in rosulam congestis patentibus apice recurvis siccitate tortuosis erectis obovato-acuminatis marginatis apice argute serratis margine inferne reflexis, nervo subexcurrente, seta elongata apice in collo arcuato capsulæ desinente, capsula elongato-cylindrica arcuato-nutante, operculo conico apiculato brevi.—*Bridel, Bryol. Univ. v.* 1. *p.* 699. *Fl. Antarct. pp.* 134, 415. B. leptothecium, *Taylor, MSS.*

Hab. Northern Island: Auckland, *Colenso:* Bay of Islands; common on stumps of trees. Southern Island, *Lyall.*

Also found in the Isle of Bourbon, Tasmania, Australia, and South America. Our specimens agree very well

with Bridel's description, but we have seen no authentic specimen, and there is no published figure; those gathered by Raoul are very tall (nearly 3 inches), with setæ above 2 inches long. *Leaves* twisted and crisped when dry, showing the pale subcartilaginous border, dark green; the nerve reddish in the lower leaves. *Capsule* very long and slender, arcuate, pale brown.—This species varies, with larger, more oblong leaves, and in the length of the capsule; in Tasmania with more slender stems and reddish foliage. *B. andicolum*, Humb. et Bonpl., seems to be only a variety of this.

Obs.—A solitary stem of what is believed to be *B. intermedium*, Bridel, occurs mixed with another New Zealand Moss: it is a smaller species than *B. bimum*, but with the same inflorescence; lower leaves tinged with red; capsule oblong-pyriform. It is remarkable for ripening the capsules of the same tuft at different periods in succession.

Gen. XXXI. MNIUM, *Bruch et Schimp.*

Peristomium Bryi. *Capsula* pendula, ovali-oblonga, annulata. *Operculum* convexum, apiculatum vel rostellatum. *Calyptra* cuculliformis.—Caulis *innovationibus e basi* (*nunquam ex apice florali ut in* Bryis) *prolificans*. Folia *magna, subcoriacea, areolis hexagonis, versus caulis floriferi apicem in rosulam polyphyllam congesta*. Flores *masculi discoidei, paraphysibus clavatis*.

1. Mnium *rostratum*, Schwægr.; hermaphroditum, caule fertili e basi decumbente erecto, surculis sterilibus vage repentibus, foliis inferioribus ovatis acuminatis superioribus ovali-oblongis obtusis apiculatis marginatis limbo remote dentato nervo subcontinuo, setis aggregatis, capsulis subpendulis, operculo rostrato.—*Schwægr. Suppl. t.* 79. *Fl. Antarct. p.* 415.

Hab. Northern and Middle Islands, *Colenso, Raoul*. (A native of England.)

Found in all Europe and North America, and at the Straits of Magelhaens.—*Leaves* almost retuse, with an obscure very short mucro, crisped and undulated when dry.

2. Mnium *rhyncophorum*, Hook.; foliis patulis deflexis lingulato-oblongis obtusis undulatis marginatis denticulatis crassinerviis densius minutissime areolatis, capsula cernua, operculo rostrato.—*Hook. Ic. Pl. t.* 20. *f.* 3. *Harvey in Journ. Bot.* 1840, *p.* 10. M. rostratum, β Javanicum, *Nees*.

Hab. Northern and Middle Islands: shores of Waikare Lake, and wood near Turanga, *Colenso*. Chalky Bay, *Lyall*.

A native of the East Indies, South America, Java, Ceylon, Sandwich Islands.—Differs from *M. rostratum* in the more elongated leaves, with considerably smaller opaque areolæ; nerve strong, bordered on each side with pellucid areolæ. Inflorescence the same.

Tribe IX. Bartramiaceæ.

[This group differs from all others having a Bryoid peristome, in the globose capsules mostly furrowed when dry, and in the rigid, tapering, serrated, papillose leaves, with quadrate areolæ.]

Gen. XXXII. CONOSTOMUM, *Swartz*.

Peristomium simplex. *Dentes* 16, lanceolato-subulati, in conum persistentem conniventes, apice connexi. *Capsula* globosa, microstoma, exannulata. *Operculum* conico-rostellatum. *Calyptra* brevissima, subulata, latere fissa.

1. Conostomum *australe*, Swartz; monoicum, caule erecto ramoso, ramis fasciculatis, foliis erectis densissime imbricatis lineari-lanceolatis acuminatis nervo lato excurrente cuspidatis supremis piliferis, capsula subrotundata inclinata, operculo oblique rostellato.—*Swartz, in Schrad. New Bot. Journ. Schwægr. Suppl. t.* 130. *Fl. Antarct. pp.* 182, 411.

Hab. Northern Island: Ruahine Mountains, *Colenso*.

Found also at Cape Horn and all Antarctic Islands.—*Leaves* more appressed than in *C. boreale*, longer and more or less piliferous, and essentially different in the inflorescence.

2. Conostomum *pusillum*, Hook. fil. et Wils.; monoicum, caule humili laxius cæspitoso, foliis suberectis laxe imbricatis lanceolatis acuminatis piliferis margine reflexis duplici serie serratis laxe reticulatis nervo angustiore, capsula suberecta. (Tab. LXXXVI. Fig. 2.)

Hab. Northern Island: top of the Ruahine Mountains, *Colenso.*

A very distinct species, quite different in aspect from the preceding.—Seldom more than 1 inch in height, often much smaller. *Stems* about 2 lines long. *Leaves* less crowded, not appressed when dry, but lax, with wavy hair-points, yellowish-green, lower leaves brown, mixed with dark red radicles, reticulation larger and more pellucid. *Seta* pale reddish, glossy, half an inch long or more. *Capsule* pale, furrowed when dry. *Operculum* less than half its length, conical, with inclined beak. *Teeth* slender, red. *Calyptra* brown, covering the operculum only. Male and female flowers contiguous, whereas in *C. australe* the male flower terminates a branch.—Plate LXXXVI. Fig. 2:—1, plant, *nat. size;* 2, young, and 3 mature, capsules; 4, leaf; 5, portion of ditto:—*all magnified.*

Gen. XXXIII. CRYPTOPODIUM, *Bridel.*

Peristomium duplex; *exterius,* dentes 16, lanceolato-acuminati, reflexi; *interius,* membrana in processus 16 imperforatos ciliis interjectis fissa. *Capsula* ovalis, macrostoma, brevipes, lævis, exannulata, erecta.—*Habitus, folia, etc.* Bartramiæ.

1. Cryptopodium *bartramioides,* Menz.; dioicum, caule elongato rigido subramoso, foliis erecto-patentibus subsecundis lineari-subulatis solidinerviis rigidis duplici serie spinuloso-serratis, capsulis immersis aggregatis, operculo convexo apiculato.—*Bridel, Bryol. Univ. v.* 2. *p.* 31. Bryum bartramioides, *Hook. Musc. Exot. t.* 18. *Schwægr. Suppl. t.* 160.

Hab. Northern and Middle Islands: Ruahine Mountains, *Colenso.* Bligh's, Thomson's, and Milford Sounds, *Lyall.*

Stems 2–6 inches long, curved. *Leaves* long, crowded, rigid, tapering gradually from a wide base. *Inflorescence* certainly dioicous (Bridel states the contrary). *Capsules* often three together, not contracted at the mouth. *Pedicel* shorter than the capsule. *Operculum* nearly half as long, shaped as in *Bryum,* and not, as usual in *Bartramiæ,* covering a large peristome. *Inner peristome* furnished with intermediate cilia, but they seem to be irregular and not unfrequently absent.

Gen. XXXIV. BARTRAMIA, *Hedwig.*

Peristomium duplex; *exterius,* dentes 16, ut in *Bryo,* siccitate incurvi; *interius,* membrana 16-plicata, usque supra medium in processus 16 cum dentibus alternantes fissa, demum per totam longitudinem in crura duo divergentia fissa, ciliis parvulis interjectis vel nullis. *Capsula* subsphærica, erecta vel cernua, raro pendula, siccitate sulcata, plerumque microstoma, exannulata. *Operculum* plano-conicum, breve. *Calyptra* parva, subulata, latere fissa.—Folia *angusta, rigida, serrata, costata, quadrate areolata, papillosa.* Caules *fasciculato-ramosi, radiculoso-tomentosi.*

§ 1. Bartramia, Bridel.—*Vage ramosæ.*

1. Bartramia *Halleriana,* Hedw.; monoica, procera, vage ramosa, ramis subfastigiatis, foliis patentibus vel secundis e basi lata subvaginante lineari-subulatis serrulatis, capsula subglobosa brevipedicellata immersa, operculo conico.—*Hedw. Stirp. Musc. v.* 2. *t.* 40. *Bruch et Schimp. Bryol. Europ.*

Hab. Northern Island: Ruahine Mountains and Waikare Lake, on trees, *Colenso.*

Found in all Europe, North and South America, Cape Horn. In this the fruit seems to be lateral, owing to

the growth of innovations, but the fertile flower is at first truly terminal. *Capsules* on a short pedicel of their own length, much overtopped by the leaves, often two together.—The nearly allied *B. pomiformis* has longer pedicels, and leaves less dilated and scarcely sheathing at the base.

2. Bartramia *papillata*, Hook. fil. et Wils.; dioica, caule subramoso, foliis confertis erecto-patentibus patulisve strictis e basi pallida obovata vaginante subulatis minutissime serrulatis dorso papillatis solidinerviis, seta longiuscula. (TAB. LXXXVI. Fig. 4.)

Var. β; foliis patulis siccitate crispulis.

Var. γ; foliis longioribus patulis crispulis.

HAB. Northern Island: Bay of Islands, Falls of Waitangi, *J. D. H.* Base of Tongariro and top of Ruahine mountains, *Colenso.*

About one inch in height, the typical specimens scarcely distinguishable except by the inflorescence from *B. ithyphylla.* The leaves, however, are more spreading and distinctly papillose at the back. The *var.* γ much resembles *B. longifolia*, Hook. Musc. Exot. t. 68, but it is only half the size, and the leaves are less evidently serrulate, shorter, and yellowish-green, inclining to glaucous.—PLATE LXXXVI. Fig. 4:—1, plants, *natural size;* 2. capsule and operculum; 3, calyptra; 4, leaf:—*all but fig.* 1 *magnified.*

§ 2. PHILONOTIS, Bridel.—*Ramis fasciculatis.*

3. Bartramia *appressa*, Hook. fil. et Wils.; dioica, pusilla, caule brevi gracili fasciculato-ramoso, foliis suberectis imbricatis ovatis acuminatis serrulatis excurrentinerviis siccitate appressis. (TAB. LXXXVI. Fig. 5.)

HAB. Northern Island: Bay of Islands, Falls of Waitangi, *J. D. H.* Wairarapa valley, *Colenso.*

Leaves glaucous, papillose. *Male flower* discoid, large, red; *perigonial leaves* spreading, much larger and longer than the stem-leaves, lanceolate, acute, nerved, serrulate.—In colour like *B. glauca*, Hook. et Arnott, but leaves wider, shorter, more entire, margin plane. *B. laxissima*, C. Müller, has narrower leaves, nerve vanishing near the apex, and lax reticulation. *B. cycnea*, Mont., and *B. ambigua*, Mont., both from Chili, are very different according to their descriptions.—PLATE LXXXVI. Fig. 5:—1, plant, *natural size;* 2, 3, leaves, *both magnified.*

4. Bartramia *marchica*, Brid.; dioica, dense cæspitosa, foliis undique patentibus vel subsecundis ovato-lanceolatis acuminatis carinatis margine planis serrulatis excurrentinerviis haud plicatis, perigonialibus lanceolatis acutis solidinerviis, capsula subsphærica cernua.—*Bridel, Mant. Musc. Schwægr. Suppl. t.* 239. Philonotis marchica, *Bridel, Bryol. Univ. v.* 2. *p.* 23.

HAB. Northern Island, *Colenso.* (A native of England.)

A European Moss.—*Stems* two inches high.—It differs from small states of *B. fontana* by the plane margined leaves and by the acute nerved perigonial leaves, and from *B. calcarea* by the narrower nerve and less robust habit. It is doubtful whether the East Indian *B. falcata*, Hook. (Musc. Exot.) be more than a variety of this; but the leaves are compresso-carinate, so as not to flatten without rupture, and the reticulation is smaller. *B. Turneri*, Schwægr., may be a state of *B. falcata*, with more acute leaves.

5. Bartramia *uncinata*, Schwægr.; dioica, caule breviusculo fasciculato tomentoso, foliis confertis subfalcatis ovato-lanceolatis acuminatis excurrentinerviis serrulatis margine reflexis, capsula cernua.—*Schwægr. Suppl. pt.* 1. *v.* 2. *p.* 60. *t.* 57, *sub nomine* B. scabrida.

HAB. Northern and Middle Island: Port Cooper, *Lyall, Oldfield.*

Smaller than the preceding. *Leaves* more crowded, more secund, more produced and setaceous at the apex, the margin recurved. *Seta* about an inch long. *Branches* short, often curved or uncinate.—A native of Guadaloupe, Martinique, North and South America.

6. Bartramia *radicalis*, P. Beauv.; dioica, foliis dissitis lanceolatis acuminatis excurrentinerviis serrulatis margine reflexis, capsula cernua.—*P. Beauv. Prodr. Ætheog. p.* 44. *Schwægr. Suppl. t.* 61.

HAB. Throughout the Islands: hills, Bay of Islands, *J. D. H.* Auckland, *Sinclair.* Oroua River, *Colenso.* Southern Island, *Lyall.*

A Southern United States plant.—Original specimens not being before us, the identification of those from New Zealand is somewhat doubtful. They differ from the preceding in the longer, narrower, distant leaves, showing the red stem very conspicuously; serratures more distinct. Habit more slender.—*B. mollis,* Doz. et Molkb., from Java, seems to be very closely allied, and is perhaps only a variety with more crowded leaves.

7. Bartramia *affinis,* Hook.; dioica, caule longiusculo fasciculato-ramoso, foliis erecto-patentibus confertis ovato-lanceolatis anguste attenuatis subpiliferis integerrimis strictis margine recurvis subrevolutis, seta longiuscula, capsula ovali pendula, operculo conico-acuminato.—*Hook. Musc. Exot. t.* 176. *Schwægr. Suppl. t.* 137.

HAB. Northern Island: scoriæ at Manakau Bay, west coast, *Colenso.* Auckland, *Knight.*

One to two inches long or more. *Leaves* entire and recurved in the margin, appressed when dry. *Capsule* pendulous. *Male flower* discoid, conspicuous.—In habit it approaches to the next section, but the leaves are not plicate. A Tasmanian Moss.

§ 3. BREUTELIA, Bruch et Schimp.—*Leaves plicato-striate, with a narrow nerve.*

8. Bartramia *pendula,* Hook.; dioica, caule fasciculato ramoso tomentoso, foliis patentibus ovato-lanceolatis longe acuminatis serrulatis striatis excurrentinerviis, seta elongata, capsula oblonga sulcata pendula. —*Hook. Musc. Exot. t.* 21. *Schwægr. Suppl. t.* 239. *Fl. Antarct. pp.* 133, 412.

Var. β; foliis magis confertis secundis viridibus nervo longius excurrente.

HAB. Throughout the Islands, abundant.

Also found at Cape Horn, Campbell's Island, Tasmania, Cape of Good Hope?—Nearly allied to *B. tomentosa,* Hook., but differing in the oblong pendulous capsule, and somewhat broader leaves.

9. Bartramia *gigantea,* Bridel; foliis lanceolato-acuminatis plicato-striatis serrulatis rigidis, seta elongata, capsula oblonga sulcata cernua.—*Schwægr. Suppl. t.* 161.

HAB. Middle Island: Milford Sound, *Lyall.*

Perhaps not distinct from the preceding. *Stems* more robust. *Leaves* wider, more evidently plicato-striate, less attenuated at the apex. *Seta* longer. *Capsule* less pendulous, sometimes almost erect.—The original barren specimen of *B. gigantea,* from the Isle of Bourbon, may be distinct, having leaves very widely spreading and sharply serrated (*vide* Schwægr. Suppl. t. 63, and Bridel, Bryol. Univ. 2. 36).—A Tasmanian plant.

Tribe X. FUNARIACEÆ.

Gen. XXXV. FUNARIA, *Schreber.*

Peristomium duplex: *exterius,* dentes 16, obliqui, lanceolato-subulati, crebre articulati, apice disco reticulato connexi, inferne striati, intus trabeculati: *interius* basi dentibus adnatum, processus sedecim lanceolatos planos dentibus oppositos sistens. *Capsula* pyriformis, ventricosa, inclinata vel cernua, apophysata, orificio obliquo. *Annulus* compositus, subinde nullus. *Operculum* breve, subconicum. *Calyptra* inferne vesicularis vel inflata, superne subulata, demum latere fissa.—Florescentia *monoica:* flos masc. *discoideus.* Antheridia *paraphysibus valde clavatis immixta.* Musci *biennes;* foliis *laxe reticulatis teneris.*

1. Funaria *hygrometrica,* Hedw.; foliis superioribus in gemmam conniventibus late ovali-lanceolatis concavis integerrimis nervo continuo perigonialibus apice serratis, capsula incurvo-pyriformi striata sicca plicata ore corrugata annulo composito, operculo convexo, seta plus minus arcuata.—*Hedw. Sp. Musc. p.* 172. *Bruch et Schimp. Bryol. Europ. Fl. Antarct. pp.* 135, 415.

Var. *β. calvescens;* caule gracilente, foliis superioribus patentibus siccitate contortis, capsula in pedicello elongato stricto suberecta graciliore.—F. calvescens, *Schwægr. Suppl. t.* 65.

HAB. Common throughout the Islands.

This species is found in all parts of the world, the *var. β* in warm moist situations. The corrugated border immediately surrounding the mouth of the capsule is a constant character of this species.—*Operculum* with a beautiful red border.

2. Funaria *glabra,* Tayl.; foliis erecto-patentibus obovatis apiculatis apice serrulatis evanidinerviis, capsula glabra clavato-pyriformi curvula hinc gibba exannulata, operculo planiusculo.—*Taylor in Lond. Journ. Bot.* 1846, *p.* 57.

HAB. Northern Island: Ahuriri and Raukawa mountains, *Colenso.*

Inner peristome small and imperfect. *Operculum* not coloured at the margin. *Seta* straight, twisting to the left as in *F. hibernica,* but the leaf is more like *F. serrata.* In the elongated capsule it differs from both.—The New Zealand specimens have longer setæ than the original ones, which were found at Swan River, its only other known habitat.

3. Funaria *cuspidata,* Hook. fil. et Wils.; foliis patentibus ovatis acuminatis planiusculis integerrimis excurrentinerviis, capsula erecta pyriformi exannulata, operculo planiusculo, peristomio interno imperfecto. (TAB. LXXXVI. Fig. 3.)

HAB. Northern Island: Bay of Islands, *J. D. H.*

One inch in height. *Capsule* small, erect, symmetrical, as in *Physcomitrium. Inner peristome* nearly obsolete. *Seta* pale.—Differs from *F. subnuda,* Tayl., from Swan River (which is scarcely if at all distinct from *F. physcomitrioides,* Mont.) in the narrower leaves, with an excurrent nerve.—PLATE LXXXVI. Fig. 3:—1, plants, *natural size;* 2, calyptra; 3, immature, and 4, mature capsules; 5, leaf; 6, apex of leaf:—*all but fig.* 1 *magnified.*

Gen. XXXVI. ENTOSTHODON, *Schwægr.*

Peristomium simplex. *Dentes* 16, infra capsulæ orificium adnati, simplices vel gemelli, lanceolati, intus trabeculati, siccitate erecti. *Capsula* erecta, pyriformis. *Operculum* convexo-planum. *Calyptra* vesiculari-cucullata, ut in *Funaria.—Florescentia, habitus, etc., omnino ut in* Funaria.

1. Entosthodon *gracilis,* Hook. fil. et Wils.; caule brevissimo, foliis erectis conniventibus subellipticis acutis concavis subcarinatis integerrimis evanidinerviis, seta elongata gracili (siccitate sinistrorsum tortili), capsula erecta ex apophysi angustiore plicata pyriformi exannulata, operculo planiusculo. (TAB. LXXXVI. Fig. 7.)

HAB. Northern Island: Bay of Islands, *Sinclair, J. D. H.*

Resembles *Funaria cuspidata* in size and general aspect, but very different in the leaves. Allied to *E. obtusifolius,* Hook. fil., but has acute leaves.—*Capsule* small, when dry contracted below the mouth.—PLATE LXXXVI. Fig. 7:—1, plants, *natural size;* 2, moist, and 3, dry capsules; 4, leaf; 5, apex of leaf:—*all but fig.* 1 *magnified.*

Gen. XXXVII. PHYSCOMITRIUM, *Bridel.*

Peristomium nullum. *Capsula* erecta, pyriformis, symmetrica, exannulata. *Operculum* conicum. *Calyptra* vesiculari-cucullata.—*Florescentia, habitus, etc., omnino* Funariæ.

1. Physcomitrium *apophysatum,* Tayl.; caule brevi, foliis erecto-patentibus ovatis acuminatis subserrulatis concavis evanidinerviis, seta brevi, capsula erecta clavato-pyriformi siccitate sub ore constricta.—*Taylor in Lond. Journ. Bot.* 1846, *p.* 43. (TAB. LXXXVI. Fig. 6.)

Var. β; foliis subpiliferis magis acuminatis.

HAB. Northern Island: Bay of Islands, on clay banks, *J. D. H.* Var. β. Hawke's Bay, *Colenso.*

One-fourth of an inch long. *Seta* short, rather thick. *Capsule* large for the size of the plant, as long as the pedicel, and in the var. β rising very little above the leaves.—Found also at Swan River.—PLATE LXXXVI. Fig. 6:—1, plants, *natural size;* 2, plant, *magnified;* 3, young capsule and calyptra; 4, leaf:—*all but fig.* 1 *magnified.*

2. Physcomitrium *pyriforme,* Bruch et Schimp. *Bryol. Europ.*

Var. β. *pumilum;* foliis latioribus erecto-patentibus subspathulatis acutiusculis concavis serrulatis nervo subcontinuo, seta brevi, capsula pyriformi suberecta annulata, operculo conico apiculato.

HAB. Northern Island: Bay of Islands, *Colenso, J. D. H.* (A native of England.)

This species is common in Europe and in North America; South America? In size and aspect this comes very near to *P. sphæricum,* but the ripe capsule is turbinate, wide-mouthed, and of thick texture. Whole plant not more than three lines in height, except those specimens gathered by Mr. Colenso, which are twice the size.

3. Physcomitrium *pusillum,* Hook. fil. et Wils.; caule brevissimo, foliis patentibus spathulatis acuminulatis subintegris nervo subcontinuo, capsula immersa subsessili subsphærica, operculo conico, calyptra parva conico-mitriformi basi lacera. (TAB. LXXXVII. Fig. 1.)

HAB. Northern Island, *Sinclair.*

A solitary individual found amongst other Mosses. Resembles *Phascum patens,* and is closely allied to *Gymnostomum Niloticum,* Del. (Fl. Egypt.), which has much longer and more acuminated leaves.—*Calyptra* small, covering the operculum only. *Pedicel* shorter than the roundish capsule. *Male flower* discoid, with clavate paraphyses. The *Aphanorhegma serrata,* Sulliv. (in Gray, Manual Bot.), which resembles this, has leaves serrulate, acuminate, capsule hemispherical, calyptra conical, not subulate above, short; male flower contiguous to the female, very obscurely discoid, wanting the proper perigonial leaves.—PLATE LXXXVII. Fig. 1:—1, plants, *natural size;* 2, capsules and perichætial leaves; 3, capsule removed; 4, calyptra; 5, 6, leaves:—*all but fig.* 1 *magnified.*

4. Physcomitrium *Perrottetii,* Mont.; parvulum, foliis ovatis acuminatis concavis in bulbum conniventibus nervo excurrente, capsula pyriformi, operculo plano.—*Mont. in. Ann. Sc. Nat.* xvi. 1841, *p.* 256.

Var.; foliis laxius areolatis, nervo subcontinuo.

HAB. Northern Island: Auckland, *Knight.*

Resembles *P. apophysatum* in the foliage, but the capsule is pyriform, not clavate.—Also an Indian species.

Tribe X. HEDWIGIACEÆ.

Gen. XXXVIII. HEDWIGIA, *Ehrhart.*

Peristomium nullum. *Capsula* globosa, immersa vel longius pedicellata, brevicolla, exannulata. *Operculum* subconicum vel conico-rostratum. *Calyptra* minuta, conica vel cucullata. *Flores* monoici vel dioici; masculi gemmæformes, axillares.—Folia *enervia, concava.*

§ 1. EURYSTOMUM.—*Rhizoma repens, subterraneum. Folia laxe reticulata. Sporæ prægrandes.*

1. Hedwigia *repens,* Hook.; rhizomate repente subterraneo, foliis surculi sterilis patulis subrotundis acuminulatis fertilis conniventibus majoribus ovatis longe acuminatis apice attenuatis integerrimis laxe reticulatis albescentibus membranaceis, capsula immersa in vaginulam brevissimam sessili sphærica ore dilatato, operculo conico apiculato, calyptra minuta conica valde fugaci, sporis prægrandibus.—*Hook. Musc. Exot. t.* 106. *Wils. in Lond. Journ. Bot.* 1846, *p.* 143. *t.* 4 *a.*

HAB. Northern Island: Raukawa ridge, *Colenso.*

Also found in Australia by Menzies, and Swan River, by James Drummond. One of the most remarkable of Mosses, growing on loose vegetable soil, the succulent rhizoma extensively creeping.—*Stems* 1–2 lines long. *Capsule*

large, concealed by the perichætial leaves, its wide mouth after the fall of the operculum nearly closed with a membrane proceeding from the sporular sac, leaving an aperture scarcely large enough for the escape of the very large spores. *Calyptra* exceedingly small, barely covering the point of the operculum. *Inflorescence* monoicous. *Male flower* spuriously gemmiform, or axillary below the fertile flower; *antheridia* mixed with filiform paraphyses.

§ 2. SCLEROSTOMUM.—*Capsula scleroderma, siccitate striata; operculo rostrato; calyptra cucullata. Folia coriacea, rigida. Florescentia dioica.*

2. Hedwigia *Humboldtii*, Hook.; caule erecto pinnatim ramoso, foliis imbricatis obovatis concavis piliformi-acuminatis rigidis coriaceis, seta longiuscula, capsula subglobosa sulcata, operculo e basi planiusculo oblique rostrato, calyptra cucullata.—*Hook. Musc. Exot. t.* 137. Anictangium, *Bridel, Bryol. Univ. Fl. Antarct. pp.* 135, 415.

Var. *β. australis;* caule breviore, foliis brevius acuminatis immarginatis, seta brevi.

HAB. Middle Island, *Lyall.*

A native of Tasmania, Swan River, and King George's Sound, the Antarctic Islands, and South America. After careful examination, we find this Moss to be truly acrocarpous, contrary to the opinion of Bruch and Schimper. —*Operculum* with a long beak. *Calyptra* cucullate, reddish-brown. *Seta* $\frac{1}{3}$ inch long. *Perichætial leaves* sheathing, larger than the rest, reddish, glossy. *Inflorescence* dioicous. *Male flowers* axillary, numerous. *Antheridia* in the axils of the perigonial leaves.—This Moss will rank very near to *Braunia* (Bryol. Europ.), and will constitute a separate genus.

Tribe XI. SPLACHNEÆ.

Gen. XXXIX. EREMODON, *Bridel.*

Peristomium simplex. *Dentes* 8 æquidistantes, vel 16 per paria connexi, infra capsulæ ore orti, plani, siccitate incurvi, vel recurvi. *Capsula* erecta, oblonga vel clavata, anguste apophysata, exannulata. *Operculum* convexo-conicum. *Calyptra* conico-mitræformis, basi appendiculata, lacera, glabra vel apice plus minus aspera.—Florescentia *monoica vel dioica:* flos masc. *capituliformis subdiscoideus, foliis involucralibus e medio dilatatis:* antheridia *paraphysibus subclavatis immixta.* Folia *mollia, laxe areolata, serrata, acuminata, nervo subcontinuo, molli.*

This group differs from *Splachnum*, *Dissodon*, and *Tayloria*, of Bryol. Europ., in the smaller number of divisions of the peristome, supposed to consist, as first suggested by Brown, of thirty-two teeth, more or less united into single or double pairs. *Tetraplodon* of Bryol. Europ. is considered to have thirty-two teeth, divided into sixteen double teeth; at first appearing as eight double pairs, subsequently as sixteen pairs: but in that genus the calyptra is dimidiate, without any inflexed appendage at the base, and the apophysis is larger than in this, which does not appear to have further subdivision of the peristome than that of sixteen intimately paired teeth.—Very probably *Orthodon* of Bridel will be found to agree essentially with *Eremodon* in every respect but the hairy calyptra, and both may ultimately be advantageously united into one genus.

1. Eremodon *robustus*, Hook. fil. et Wils.; caule longiusculo tomentoso, foliis laxis patulis apice recurvis spathulato-lanceolatis acuminatis argute serratis nervo sub apice evanido, seta longiuscula, capsula clavato-oblonga erecta, peristomii dentibus octo siccitate incurvis, operculo subconico, calyptra apice scabra. (TAB. LXXXVII. Fig. 2.)

HAB. Northern Island: Bay of Islands, etc., *Oldfield, Sinclair.* Auckland, *Knight.*

A Tasmanian Moss. Fertile specimens 1 inch long or more, barren stems often 2–3 inches, with much of the aspect of a *Mnium*, or of *Bryum Auberti:* it also resembles *Tayloria serrata*, Bryol. Europ., but is more robust.—*Leaves* distant, large, loosely reticulated, spreading, and not much altered when dry. *Seta* $\frac{1}{2}$ inch long, rather thick. *Teeth* wide at the base, yellow. *Calyptra* four-parted at the base, thence conical and entire, rough at the apex—PLATE LXXXVII. Fig. 2:—1, 2, plants, *natural size;* 3, capsule; 4, teeth; 5, 6, leaves:—*all but fig.* 1 *magnified.*

2. Eremodon *octoblepharis,* Hook.; foliis obovatis longe acuminatis subpiliferis integerrimis, capsula clavata erecta, peristomii dentibus octo geminatis, calyptra lævi.—*Hook. Musc. Exot. t.* 167. *Schwægr. Suppl. t.* 129. *Fl. Antarct. p.* 123.

HAB. Throughout the Islands, common; on clay ground, etc., *Lyall, Sinclair, J. D. H.*

Found also in Tasmania, Australia, and the Antarctic Islands. Distinguished from its allies by the entire leaves.—Not 1 inch in height. *Peristome* with eight double teeth, perforated down the middle, but seldom cloven, reflexed when dry; *columella* in that state slightly prominent. Nerve of the leaf sometimes excurrent, or continuous with the narrow setaceous point.

3. Eremodon *purpurascens,* Hook. fil. et Wils.; foliis patulis obovatis acuminatis evanidinerviis apicibus recurvis, capsula elliptico-oblonga microstoma, apophysi obconica angusta, operculo conico.—*Fl. Antarct. p.* 123. *t.* 57. *f.* 6.

HAB. Northern Island: Auckland, *Colenso, Bolton, Knight.*

A native of Campbell's Island.

Tribe XII. POLYTRICHEÆ.

Gen. XL. POLYTRICHUM, *Dill., Linn.*

Peristomium simplex. *Dentes* 32–64, interdum 16, breves, ligulati, inflexi, duriusculi, e filis inarticulatis duplici lamina dispositis contexti, haud hygroscopici, epiphragma inter apices dentium sustentum. *Calyptra* parva, cuculliformis, plerumque indumento villoso vestita, interdum nuda.

A very natural and peculiar group, having the short almost horny teeth attached to a hemispherical distension of the summit of the columella, which in the ripe capsule forms a membranous tympanum, so that the sporules can only escape through interstices between the numerous teeth.—*Leaves* with vertical lamellæ on the upper side, attached to the nerve.—For the sake of brevity the genera given in Bryol. Europ. are here treated as subgeneras.

Subgenus 1. ATRICHUM, *P. Beauv.*—Calyptra *anguste cucullata, elongata, nuda, apice tantum spinulosa.* Capsula *cylindrica.* Operculum *tenuirostre.* Folia *lanceolato-ligulata, nervo angusto, parce lamellosa, subflaccida.*

1. Polytrichum (Atrichum) *angustatum,* Hook.; dioicum, gracile, foliis elongato-lanceolatis subpatentibus anguste limbatis superne spinoso-serratis siccitate crispis, capsula suberecta tenui-cylindracea, operculo tenuirostri.—*Hook. Musc. Exot. t.* 50. Atrichum, *Bruch et Schimp. Bryol. Europ.*

Var.; setis aggregatis, calyptra longiore angustissima.

HAB. Northern Island: shaded woods; Huiarau, *Colenso.*

This species is found in Europe and in North America.—Above 2 inches high. *Seta* ½ inch or more long, often three together. *Capsules* slightly curved, brown. *Leaves* undulated and crisped when dry, serratures in a double row. *Calyptra* longer than the capsule, very slender, spinulose at the apex. *Operculum* with a long, slender, inclined beak.

Subgenus 2. OLIGOTRICHUM, *De Cand., Bruch et Schimp.*—Calyptra *apice papillata v. subpilosa, cucullata.* Capsula *in pedicello tenaci ovato-cylindrica.* Caules *rigidi;* foliis *brevibus, solidis, late costatis;* floribus 6 *rosulatis;* operculo *brevirostri.*

2. Polytrichum (Oligotrichum) *tenuirostre,* Menz.; foliis patentibus oblongo-lanceolatis obtusiusculis integerrimis parce angusteque lamellatis siccitate incurvis, seta longissima firma, capsula ovato-oblonga suberecta, operculo tenuirostri.—*Hook. Musc. Exot.*

HAB. Middle Island: Dusky Bay, *Menzies, Lyall.*

This species has been collected very sparingly.—*Stems* short, ¼ inch long. *Seta* from 1½ to 3 inches long, very

tough, but slender, red below, yellowish above, glossy. *Leaves* from ovate-lanceolate in the lower part of the stem, to oblong-lanceolate above, tapering in the upper part, subacute, their margins entire, concave; nerve narrow, continued to the apex; lamellæ very narrow and indistinct, unless in a section; when dry the leaves are incurved, rounded at the back, and folded together at the edges. *Capsule* inclined or horizontal, elliptical when fully ripe, at first nearly erect. *Operculum* in Lyall's specimens longer than the capsule. *Calyptra* absent. *Teeth* of peristome thirty-two, white, very small and short as in *P. Molinæ*, Mont., which has narrower, more subulate leaves, more copiously lamellate and a wider nerve. It is equally distinct from *P. canaliculatum*, Hook. et Arn. The male plant is very short; perigonial leaves spreading, widely ovate.

Subgenus 3. Psilopilum, *Bridel.*—Peristomii dentes 16–32, *brevissimi.* Capsula *ovato-ventricosa.* Calyptra *apice pilosiuscula, inferne nuda.*

3. Polytrichum (Psilopilum) *crispulum*, Hook. fil. et Wils.; dioicum, foliis laxe patentibus subflaccidis siccitate crispulis incurvis lanceolato-oblongis acutiusculis denticulatis anguste lamellatis, seta elongata, capsula inclinata ovata microstoma, operculo rostrato, peristomii dentibus 32 minutis angustis. (Tab. LXXXVII. Fig. 3.)

Hab. Northern Island: shaded woods; Huiarau, *Colenso.*

Stems 1 inch long. *Seta* 1½ inch long, rather thick. *Leaves* crisped and tortuous when dry. *Calyptra* large, as long as the capsule. *Operculum* half as long, reddish-brown, pubescent at the apex only.—A taller species than *P. compressum*, Hook. fil. et Wils. (Hermite Island), with shorter, not subulate leaves, distinctly lamellate, and more straggling when dry.—Plate LXXXVII. Fig. 3:—1, plants, *natural size;* 2, capsule; 3, portion of peristome; 4, calyptra; 5, leaf; 6, transverse section, and 7, apex of leaf:—*all but fig.* 1 *magnified.*

4. Polytrichum (Psilopilum) *australe*, Hook. fil. et Wils.; dioicum, caule brevi, foliis confertis erecto-patentibus ovato-subulatis rigidulis canaliculatis integerrimis dense lamellatis siccitate erectis incurvis, seta breviuscula, capsula inclinata ovata ventricosa microstoma, operculo rostellato, calyptra brevi apice scabra, peristomii dentibus 16 exiguis albidis. (Tab. LXXXVII. Fig. 6.)

Hab. Northern Island: Ruahine mountains, *Colenso.*

Discovered in Hermite Island, Cape Horn, whence the specimens, from having been mixed with those of *P. compressum* in the collection, were overlooked; they agree with those from New Zealand in the peristome, but have less rigid and longer leaves.—Scarcely one inch high. *Seta* ½ inch long, stout, reddish. *Operculum* one-fourth of the length of the capsule, which has a very small mouth. *Calyptra* small, half as long as the capsule.—Differs in many respects from the preceding, and is more nearly allied to *P. trichodon*, Hook. et Wils., which has larger, softer, cuspidate leaves, lamellated only in the upper part.—Plate LXXXVII. Fig. 6:—1, plants, *natural size;* 2, immature, and 3, mature capsules; 4, part of peristome; 5, calyptra; 6, leaf; 7, transverse section of the same:—*all but fig.* 1 *magnified.*

Subgenus 4. Cyphoma, *Hook. fil. et Wils.*—Capsula *superne plana, inferne gibba.* Peristomii dentes 32–64. Calyptra *subnuda.* Folia *argute serrata, basi vaginantia, rigida.*

5. Polytrichum (Cyphoma) *Magellanicum*, Hedw.; caule ramoso, foliis patentibus recurvis rigidis e basi ovata vaginante subulatis serratis, capsula inclinata vel horizontali oblonga semitereti, operculo conico-rostrato, calyptra pilosiuscula.—*Hedw. Sp. Musc. t.* 20. *Fl. Antarct. pp.* 132, 411. *t.* 59. *f.* 3.

Var. β; caule gracili, foliis brevioribus erecto-patentibus siccitate erectis.

Hab. Northern and Middle Islands: clay banks, Bay of Islands, *J. D. H.* etc. East Coast, *Colenso.* Milford Sound, *Lyall.* Var. β. Clay banks, Manga-Powhatu, *Colenso.* Stewart's Island, *Lyall.*

Like *P. alpinum* in general aspect.—Height 2–4 inches or more. *Calyptra* reddish, naked, except a few scattered hairs below, and a few bristly asperities at the apex. *Teeth* 64, very small, white, nearly horizontal.—The plano-convex capsule and almost naked calyptra have escaped observation until recently, and perhaps *P. giganteum*

and *P. longisetum* are only tall varieties of this species. It is found in South America, Fuegia, and Lord Auckland's Group.

Subgenus 5. PHALACROMA, *Hook. fil. et Wils.*—Capsula *teres*. Peristomii dentes 32–64. Calyptra *parce pilosa*.

6. Polytrichum (Phalacroma) *dendroides*, Commers.; caule erecto triquetro dendroideo longissimo, ramis fasciculato-fastigiatis subsimplicibus, foliis patentibus e basi vaginante ovata linearibus argute serratis siccitate patulo-incurvis, capsula inclinata brevi macrostoma, operculo longirostri, calyptra parce pilosa, peristomii dentibus 64.—*Bridel, Mant. Musc. Bryol. Univ. v.* 2. *p.* 112 (*sub* Pogonatum). *Schwægr. Suppl. v.* 2. *p.* 2. *t.* 151. *Fl. Antarct. p.* 411.

HAB. Alpine and southern parts of the Northern Island, and in the Middle Island, *Colenso, Sinclair, Lyall, etc.*

One of the most magnificent of Mosses; also a native of Fuegia.—Height 6 inches to 1 foot or more. *Stem* branched near the top, several of the branches occasionally fertile at the extremity. *Operculum* longer than the capsule, with an inclined beak. *Calyptra* reaching almost to the base of the capsule, sparingly covered with hairs, often almost naked.

Subgenus 6. POGONATUM, *P. Beauv., Brid., Bruch et Schimp.*—Calyptra *villosa*. Capsula *teres*.

7. Polytrichum (Pogonatum) *tortile*, Swartz; caule simplici, foliis e basi teneriore amplexicauli lineari-lanceolatis planis serratis siccitate laxe incurvis, capsula subtereti lineata suberecta, operculo convexo rostellato.—*Swartz, Fl. Ind. Occid. Bridel, Bryol. Univ. pt.* 2. *p.* 108. Polytrichum convolutum, *Hedw. Sp. Musc. t.* 20. P. subulatum, *Menzies, Linn. Trans. v.* 4. *p.* 303. *t.* 6. *f.* 5.

HAB. Northern Island: clay banks, near the Bay of Islands, *J. D. H.* Tehawera and Hutt valley, *Colenso, Sinclair.*

A native of the West Indies, East Indies, and South America.—Height 1–2 inches or more. *Capsule* sometimes smoothly rounded, in other cases distinctly marked with about six prominent lines, not angles, and the columella also is winged. Hence it is doubtful whether this Moss should not rank under the next subgenus; Bridel, however, places it under *Pogonatum*, and notices the lineate capsule in the specific character. Original specimens from Swartz, in Herb. Hooker, are too imperfect to satisfy us on this point, or even as to the identity of the New Zealand specimens, some of which are so small as greatly to resemble the more common *P. aloides*, which has a shorter operculum and the leaf not flattened nor at all pellucid: in this state it is *P. subulatum* of Menzies.

Subgenus 7. POLYTRICHUM, *Bridel, Bruch et Schimp.*—Capsula *angulata, apophysi discoidea instructa*. Operculum *brevius rostratum*. Calyptra *villosa*. Peristomii dentes *sæpius* 64. Columella *alata*.

8. Polytrichum *commune*, Linn.; caule elongato, foliis patenti-recurvis lineari-lanceolatis longis serratis lamellis margine subbifidis perichætialibus membranaceis erectis vaginantibus, capsula tetragona, operculo brevirostri.—*Linn. Sp. Pl. Bruch et Schimp. Bryol. Europ.*

Var. β; caule gracili, foliis confertioribus erecto-patentibus.

Var. γ; caule gracili, foliis remotis brevioribus.—P. remotifolium, *Schwægr. Supp. t.* 154?

HAB. Northern Island: Bay of Islands, *Sinclair.* Var. β. Middle Island: Bligh's Sound, *Lyall.* (A native of England.)

Subject to considerable variation in size and direction of the leaves.—*P. formosum* and *P. gracile* are nearly allied, but well distinguished by Bruch and Schimper. It is a native of all Europe, and North and South America.

9. Polytrichum *juniperinum*, Hedw.; caule breviusculo, foliis patentibus subrecurvis e basi vaginante lineari-lanceolatis margine inflexis integerrimis brevi-aristatis, capsula quadrangulari siccitate horizontali, operculo rostellato.—*Hedw. Spec. Musc. t.* 18. *Bruch et Schimp. Bryol. Europ.*

HAB. Northern and Middle Islands: Port Nicholson and Auckland, *Sinclair*. Otago, *Lyall*. (A native of England.)

Found in Britain, and common in all parts of the world. This can only be confounded with *P. piliferum*, which has leaves suddenly attenuated into a longer piliform apex. *P. juniperinum* varies much according to situation: when growing in wet, boggy, or turfy places, the stems are elongated, slender, and the leaves less spreading; in this state it is *P. strictum*, Auct.

Gen. XLI. DAWSONIA, *Brown*.

Peristomium penicillatum, ciliis numerosissimis, capillaribus, erectis, æqualibus, inarticulatis, capsulæ ore et columellæ apice impositis. *Calyptra* subulata, latere fissa, indumento e villis intertextis vestita. *Capsula* hinc plana, inde convexa. *Operculum* subulatum.—*Habitus, folia, florescentia, etc., omnino* Polytrichi.

The character above given accords with the original specimen of *D. polytrichoides*. In that species, however, the peristome appears to be double, the inner peristome adhering to the upper part of the columella, though, as in all other cases, originating from the sporular sac, of which it is a continuation. The cilia of the entire peristome, numbering 500 at least, or even 1000, appear to be disposed in about twelve concentric layers, three of which go to the formation of the inner peristome. In *D. superba* there are eight to nine layers, and there the peristome appears to be single, no part of it being found to adhere to the columella. A further examination of both species in a growing state is very desirable. The cilia are certainly capillary or cylindrical from the very base, and not, as Schwægrichen represents them, flat below and thence bent into a cylinder; they are about $\frac{1}{2250}$ inch in thickness, and the diameter of the spores is about $\frac{1}{3500}$ inch.

1. Dawsonia *superba*, Greville; caule elongato, foliis e basi ovato-subrotunda amplexicauli longissime linearibus rigidis spinoso-serratis erecto-patentibus, seta brevi crassa, capsula foliis subexserta, calyptra parva pallidiore pilis lævibus vestita.—*Grev. in Ann. Nat. Hist.*

HAB. Northern and Middle Islands: Auckland, *Sinclair*. Tehawera, *Colenso*. Massacre Bay and Port Cooper, *Lyall*.

From 5 to 14 inches high. *Leaves* often 1 inch long, more erect and less crowded than in the other species, their sheathing bases wider and more conspicuous, of a shining deep brown colour. *Seta* shorter and thicker. *Calyptra* smaller, paler, and less elegant, the hairs not rough, but woven together with slender, lateral, hairy branches. —The leaves in some of the specimens overtop the capsule. *Inflorescence* dioicous. Fruit ripe in August.—It is also a native of Tasmania.

Incertæ sedis.

Gen. XLII. CALOMNION, *Hook. fil. et Wils.*

Peristomium 0. *Capsula* erecta, annulata, oblonga, ore angustata. *Operculum* longirostratum. *Calyptra* dimidiata. *Florescentia* dioica; fl. mas. terminalis.—Folia *trifaria; lateralia distiche patentia, verticalia, dorsalia stipuliformia accessoriave, cauli appressa.* Surculi *dense cæspitosi, biennes, nec innovationibus continuati, e rhizomate subrepente perenni orti, erecti, stricti, complanati.*

This curious Moss may be regarded as the acrocarpous analogue of *Hyptopterygium*, Bridel. In habit and vegetation it is closely allied to *Tetraphis* and to *Schistostega*.

1. Calomnion *lætum*, Hook. fil. et Wils.—Eucladon complanatum, *Hook. fil. et Wils. in Lond. Journ. Bot.* 1844, *p.* 538. (TAB. LXXXVII. Fig. 5.)

HAB. Northern Island: Bay of Islands, on the stems of tree-ferns and dead trees, rare, *J. D. H.* Waikehi, *Sinclair*.

Stems about ¼ inch high, densely crowded, the surculi of the current year intermixed with old ones retaining the bases of the leaves only, and hence appearing bristly, rigid, simple. *Fertile stems* forming a complanate, lanceolate frond. The lateral leaves distichous, elliptic lanceolate, entire, with a stout nerve reaching nearly to the apex, vertically disposed as to their edges, but not as to their insertion on the stem, dorsal accessory leaves roundish-apiculate, appressed, larger towards the top of the stem, which is nearly naked below, or with very small scattered scale-like leaves. *Perichætial leaves* longer, erect, linear; *areolæ* round, rather small; texture of leaves firm; colour yellowish-green. *Seta* about 2 lines long. *Capsule* elliptic-oblong, erect, contracted towards the mouth, annulus distinct. *Operculum* nearly as long as the capsule, with a slender inclined beak. *Calyptra* longer, subulate, dimidiate, roughish at the apex, reddish-brown. *Male stems* in separate tufts, smaller; male flower gemmiform, with small, closely imbricated, ovate scales; paraphyses few or none.—PLATE LXXXVII. Fig. 5:—1, plants, *natural size;* 2, a plant, *magnified;* 3, capsule and calyptra; 4, capsule without a calyptra; 5, 6, 7, leaves; 8, accessory leaf:—*all magnified.*

Section 2. PLEUROCARPI.

Tribe XIII. FABRONIACEÆ.

Gen. XLIII. AULACOPILUM, *Wils.*

Peristomium nullum. *Calyptra* sulcata, magna, capsulam obtegens, latere fissa. *Capsula* erecta, æqualis, exannulata. *Seta* lateralis. *Folia* distiche imbricata, glauca, enervia. *Florescentia* monoica. (*αυλαξ, a furrow; πιλος, calyptra.*)

1. Aulacopilum *glaucum,* Hook. fil. et Wils., *Wilson in Lond. Journ. Bot.* 1848, *p.* 90. *tab.* iv *A.*

HAB. Northern Island: Bay of Islands, on trees, with *Fabronia, Colenso.*

A very small Moss, with creeping stems, sparingly branched. *Leaves* distichous, obliquely ovate, acuminate, papillose, glaucous green, appressed when dry; areolæ granular. *Perichætial leaves* erect, lanceolate. *Seta* short, not twice the length of the capsule, which is roundish-ovate, truncate at the mouth. *Operculum* conico-rostellate, half as long as the capsule. *Calyptra* nearly twice as long, embracing the seta below, and in other respects like that of *Calymperes,* when ripe split laterally, yellowish-brown.

Gen. XLIV. FABRONIA, *Bridel.*

Peristomium simplex. *Dentes* 16, coriacei, per paria approximati, inflexi. *Calyptra* cuculliformis. *Capsula* erecta, pyriformis, exannulata.—Folia *plerumque ciliato-dentata, laxe reticulata.*

1. Fabronia *australis,* Hook.; caule repente vage ramoso, foliis ovatis vel ovato-lanceolatis acuminatis concaviusculis subserratis plus minus secundis seminerviis, capsula subrotunda, operculo planiusculo.—*Hooker, Musc. Exot. t.* 160. *Schwægr. Suppl. t.* 247 (fig. melior quoad folium).

Var. β; foliis latioribus.

HAB. Northern Island: Bay of Islands, *J. D. H., Colenso.*

A very small Moss, found also in Australia (King George's Sound).—*Leaves* crowded, more or less secund, turned upwards, minutely serrulate. *Perichætial* leaves short, ovate. *Capsule* roundish, subpyriform, certainly smooth (not ribbed, as Schwægrichen figures it).—*F. secunda,* Montagne, from the East Indies, has leaves much more attenuated and less crowded, and is twice the size of this. *F. polycarpa,* Hook., has leaves entire, and of firmer texture.

Tribe XIV. Leucodonteæ.

Gen. XLV. LEUCODON, *Bridel.*

Peristomium simplex. *Dentes* 16, basi connati, perforati, bipartiti v. bifidi. *Calyptra* cuculliformis. *Capsula* erecta, æqualis, exannulata. *Florescentia* dioica.—Caulis *repens, radiciformis; rami teretes, erecti, sciuroidei.* Folia *dense imbricata, enervia, in plerisque plicato-striata, sublinearia, areolata.*

1. Leucodon *nitidus*, Hook. fil. et Wils.; caule vage ramoso, procumbente, ramis obtusiusculis, foliis laxe imbricatis ovali-oblongis obtusis concavis integerrimis enerviis estriatis margine subrecurvis, perichætialibus longioribus convolutis, seta brevi, capsula erecta oblonga siccitate sulcata, operculo longirostri, peristomii dentibus bifidis. (Tab. LXXXVII. Fig. 4.)

Hab. Northern Island: Bay of Islands, on bark of trees, rare, *J. D. H.*

Of this pretty species just enough has been gathered to supply the materials for description.—*Stem* about 1 inch long. *Leaves* erecto-patent, pale shining green, areolæ narrow. *Seta* 3 lines long, red. *Annulus* 0. *Operculum* shorter than the capsule. *Peristome* red, bi-trifid halfway down, trabeculate externally. *Male flower* absent.—Allied to *Pterogonium urceolatum*, but differs in the obtuse, very concave leaves, and dioicous inflorescence. *P. obtusifolium*, Torrey, has mucronate leaves (*sec. descr.*). In habit a *Pterogonium*, having little in common with *Leucodon sciuroides*, and if ever generically separated we propose the name of *Dichelodontium*. *Sclerodontium* of Schwægrichen, first employed for *Leucodon pallidus* (which is a *Dicnemon*, Bridel, and not pleurocarpous), has been ill associated with *S. pellucidum*, Schwægrichen, which will form a second species of our *Dichelodontium*.—Plate LXXXVII. Fig. 4:—1, plant, *natural size;* 2, capsule; 3, operculum; 4, calyptra; 5, part of peristome; 6, leaf:—*all magnified.*

Gen. XLVI. LEPTODON, *Mohr.*

Peristomium simplex. *Dentes* 16, brevissimi, tenuissimi, lineari-lanceolati. *Calyptra* cuculliformis, inferne pilis longissimis hirta. *Calyptra* æqualis, exannulata.—Caulis *repens; surculi pinnati, ramosissimi, elastici, ramulis siccitate involutis.*

1. Leptodon *Smithii*, Micheli; dioicus, caule repente, surculis bipinnatis, foliis ovato-subrotundis obtusis evanidinerviis, capsula brevi pedicellata suberecta oblongo-ovali, operculo rostrato.

Hab. Middle Island: male plant only, mixed with other Mosses, on bark of trees, *Lyall.* (A native of England.)

Found also in all Europe and the Cape of Good Hope.

Gen. XLVII. CLADOMNION, *Hook. fil. et Wils.*

Peristomium duplex: *exterius*, dentes 16, lanceolati; *interius*, membrana in processus 16 carinatos profunde divisa. *Capsula* erecta, æqualis, brevipedicellata. *Calyptra* cucullata, magna; operculum rostratum.—Caulis *repens; surculi erecti, elongati, subsimplices. Habitus* Leucodontis.

We separate the following from *Leskea* and *Neckera* on account of the habit of growth, and the strong resemblance of the fruit to that of *Leucodon.*

§ 1. *Capsula sulcata; folia enervia.*

1. Cladomnion *ericoides*, Hook.; surculis elongatis erectis subsimplicibus, foliis imbricatis subovatis apice recurvis plicato-striatis enerviis, capsula erecta oblonga sulcata, operculo longirostri.—Leskea, *Hook. Musc. Exot. t.* 140. (Leskea ericoides, *Auct.*)

Hab. Northern and Middle Islands: Dusky Bay, Port Nicholson, Wellington, Chalky Bay, Milford Sound, *Menzies, etc.*

Also found in Tasmania.—2–8 inches long. *Seta* ⅓ inch. *Inner peristome* divided halfway into sixteen carinate segments (as in *Leskea*); outer teeth yellow, firm, scarcely affected by moisture. *Spores* very large, and almost gemmiform. *Calyptra* large, covering the capsule while immature, yellowish. *Male flowers* nidulant on the leaves, small, often clustered. *Capsule* eight-angular.

2. Cladomnion *sciuroides*, Hook.; dioicum, surculis vage ramosis, ramis subcompressis incurviusculis, foliis erecto-patentibus subsecundis ovatis acuminatis plicato-striatis enerviis apice serratis, capsula erecta oblonga sulcata brevipedicellata, operculo conico-subulato.—Leskea sciuroides, *Hook. Musc. Exot. t.* 175.

Hab. Middle Island: Nelson, *Bidwill.*

Also a native of Tasmania.—About 2 inches long. *Seta* scarcely twice the length of the capsule, which is obscurely eight-angular. *Operculum* above half as long. *Calyptra* longer than the capsule. *Inner peristome* a short membrane, with rudiments of narrow segments; outer teeth pale. *Spores* small, greenish.—*Leskea distans*, Mont. (Cent. 5. 14 *bis*), may be the same Moss.

§ 2. *Capsula lævis; folia nervosa.* (Cyrtopus, *Bridel.*)

3. Cladomnion *setosum*, Hedw.; dioicum, surculis elongatis subsimplicibus, foliis confertis subsecundis e basi ovata subulato-setaceis solidinerviis serratis, capsula oblonga erecta brevipedicellata, operculo rostrato.—Neckera setosa, *Hook. Musc. Exot. t.* 8.

Hab. Northern and Middle Islands: Bay of Islands, *Sinclair.* Dusky Bay, *Menzies, Lyall.*

Also found in Tasmania and South America.—*Surculi* often 6 inches long or more. *Leaves* rigid and bristly at the apex. *Capsule* scarcely rising above the leaves. *Operculum* shorter than the capsule. *Calyptra* yellowish-brown, the length of the capsule. *Peristome* red.—In this and in the two preceding species, fruit of a former year may be observed lower down the surculus, which is annually continued from the extremity, without lateral branches. This peculiarity does not exist in genuine *Leskeæ.*

Tribe XV. Pilotricheæ.

Gen. XLVIII. METEORIUM, *Bridel.*

Peristomium duplex: *exterius*, dentes 16, erecti; *interius*, cilia totidem alternantes, basi libera vel membrana brevi connexa. *Calyptra* æqualis, erecta, exannulata, brevipedicellata. *Operculum* rostratum. *Florescentia* dioica.—Caulis *repens.* Surculi *penduli, ramosi, ramis patentibus.*

Under this section of *Pilotrichum* of Bridel we rank a few species remarkable for their slender pendulous habit: whence the name, from *μετεωρος*, *pensilis.* They seem to require separation as a group from *Pilotrichum* (named from the hairy calyptra), which has two-nerved leaves, and a rigid, erect, dendroid habit.

1. Meteorium *molle*, Hedw.; surculo elongato debili pendulo flexuoso, ramis subsimplicibus, foliis imbricatis subspathulato-ellipticis oblongis obtusis concavis integerrimis enerviis perichætialibus vaginantibus duplo longioribus, capsula ovata brevipedicellata, operculo rostrato, calyptra pilosiuscula dimidiata.—Leskea mollis, *Hedwig, Musc. Frond.* 4. *t.* 40.

Hab. Northern and Middle Islands: Dusky Bay, *Menzies.* Stewart's Island and Port Nicholson, *Lyall.*

Found also in Australia, Tasmania, Brazil, Chiloe, Chili, Chonos Archipelago, and Juan Fernandez.—*Surculi* a foot long and more, very slender. *Leaves* narrower and subcordate at the base, concave above the margins, inflexed and connivent at the apex. *Inner peristome* a membrane divided beyond the middle into sixteen carinate processes, as in *Leskea.* *Seta* not 2 lines long. *Calyptra* pale and thin. *Operculum* as long as the symmetrical capsule.—An ambiguous state of *Hypnum cochlearifolium* much resembles this, but has the capsule unequal and the operculum short.

2. Meteorium *cuspidiferum*, Taylor; surculo elongato ramoso pendulo flexili, ramis patentibus simplicibus, foliis laxe imbricatis erecto-patentibus cordato-ovatis semiamplexicaulibus apiculatis integerrimis subcoriaceis carinatis substriatis evanidinerviis minutissime areolatis basi auriculis denticulatis.—Neckera cuspidifera, *Tayl. MSS.*

Var. *β*; foliis latioribus cordatis siccitate undulatis basi lateribus reflexis.—Pilotrichum cerinum, *Wils. MSS.*

Hab. Northern and Middle Islands: Bay of Islands, *Sinclair, J. D. H.* Var. *β*. Middle Island, *Lyall.*

Also found in the East Indies, Tasmania, and Norfolk Island.—Six inches to 1 foot long or more. Dark green or sometimes yellowish. *Inflorescence* dioicous. *Fruit* not known.—Allied to *Neckera nigrescens* and to *N. Africana*, C. Müller, which have leaves gradually tapering, and more acute.

3. Meteorium *flexicaule*, Taylor; surculo elongato pendulo flexuoso, ramis patentibus simplicibus, foliis laxe imbricatis cordato-ovatis subspathulatis acuminulatis concavis estriatis integerrimis (basi tantum subdenticulatis) nervo ultra-medio.—Leskea flexicaulis, *Taylor.*

Hab. Northern Island, *Dr. Stanger*. Hawke's Bay, *Colenso.*

A Tasmanian Moss; it resembles the preceding.—*Leaves* yellowish, more closely imbricated when dry, their points only a little reflexed, smooth and convex at the back, not at all striated; Colenso's specimens are narrower below the middle and subspathulate, those from Dr. Stanger ovate, with larger auricles at the base. Dioicous. *Fruit* unknown.—Specimens gathered by Mr. Stephenson are more slender, and are probably in an early state of growth.

4. Meteorium *pusillum*, Hook. fil. et Wils.; surculo gracillimo debili breviusculo, foliis laxe imbricatis erecto-patentibus ovato-lanceolatis acuminatis integerrimis margine subreflexis nervo brevissimo, perichætialibus erectis subconvolutis lanceolatis, capsula exserta brevipedicellata ovali erecta sulcata, operculo conico. (Tab. LXXXVIII. Fig. 1.)

Hab. Northern Island: Wairarapa valley, *Colenso.*

A very minute species, slender enough to elude ordinary sight. Scarcely an inch in length. *Leaves* suberect when dry, dull green. *Seta* twice as long as the small, pale, octangular, oval capsule. *Perichætial leaves* the length of the capsule. *Operculum* half as long. *Annulus* 0. Dioicous?—Plate LXXXVIII. Fig. 1:—1, plants, *natural size;* 2, portion of plant with capsule; 3, portion of peristome; 5, leaf:—*all but fig.* 1 *magnified.*

5. Meteorium *nitens*, Hook. fil. et Wils.; caule repente, ramis densis brevibus erectiusculis, foliis ovato-lanceolatis acutis minutissime denticulatis substriatis seminerviis. (Tab. LXXXVII. Fig. 7.)

Hab. Northern Island, *Sinclair.* (Barren scrap only.)

Shining yellowish-green. *Branches* two to three lines long. *Leaves* crowded, erecto-patent, erect when dry; margin subreflexed; areolæ very narrow.—Probably an external shoot from a large patch, which may have the same pendulous habit as the preceding.—Plate LXXXVII. Fig. 7:—1, plant, *natural size;* 2, 3, leaves, *magnified.*

Gen. XLIX. CRYPHÆA, *Mohr, Bridel.*

Peristomium duplex: *exterius*, dentes 16, angusti, erecti: *interius*, cilia totidem alterna, basi libera, filiformia. *Calyptra* mitræformis, conica, glabra. *Capsula* æqualis, perichætio immersa, subsessilis, annulata. *Operculum* conicum. *Florescentia* monoica.—Caulis *repens*. Surculi *suberecti, pendulive, subpinnatim ramosi*. Folia *ovata, areolis punctiformibus, integra.*

The small conical calyptra barely covering the operculum, and the immersed capsules, distinguish this genus from the preceding.

1. Cryphæa *consimilis*, Montagne; surculo ramoso, ramis distantibus patentibus filiformibus, foliis

ovato-lanceolatis acuminatis margine subreflexis integerrimis nervo subcontinuo, capsula oblonga perichætio pilifero immersa, operculo conico acuto.—*Mont. Cent.* 5, 20.

HAB. Northern Island: Wairarapa valley, *Colenso.*

Also a native of Tasmania and Chili.—*Surculus* not two inches long, slender. *Calyptra* reddish-brown, roughish at the apex, monoicous.—We have not seen original specimens from Montagne. Perhaps *Neckera tenella*, Schwægrichen (Suppl. t. 198), may be the same, but if so, it is incorrectly figured.

2. Cryphæa *acuminata*, Hook. fil. et Wils.; surculo breviusculo parce ramoso superne fructifero perichætiis numerosis secundis incrassato, foliis erecto-patentibus ovato-acuminatis integerrimis evanidinerviis, perichætialibus setaceo-acuminatis, capsula immersa, operculo conico rostellato. (TAB. LXXXVIII. Fig. 4.)

HAB. Northern Island: Hawke's Bay, *Colenso.*

Monoicous. *Surculi* ¾ inch long.—Exceedingly like the European *C. heteromalla*, but the leaves much more gradually tapering and acute, and the nerve longer.—PLATE LXXXVIII. Fig. 4:—1, plant, *natural size;* 2, 3, leaves, *magnified.*

3. Cryphæa *dilatata*, Hook. fil. et Wils.; surculo elongato gracili pendulo ramoso, ramis patentibus brevissimis, foliis patentibus siccitate erectis laxiusculis ovato-subrotundis obtusiusculis evanidinerviis apice subcrenatis, perichætialibus lanceolatis nervosis, capsula immersa, operculo conico. (TAB. LXXXVIII. Fig. 2.)

HAB. Northern Island, *Colenso.*

Surculi 2–6 inches long, dark dull green. *Leaves* less appressed when dry than in other species, and the capsule more immersed. *Peristome* double, reddish. *Fruit* often crowded at the end of the surculus and secund, sometimes scattered on the branches. Monoicous.—PLATE LXXXVIII. Fig. 2:—1, plant, *natural size;* 2, capsule and perichætial leaves; 3, pistillidia; 4, 5, leaves:—*all but fig.* 1 *magnified.*

Tribe XVI. PHYLLOGONIEÆ.

Gen. L. PHYLLOGONIUM, *Bridel.*

Peristomium simplex. *Dentes* 16, æquidistantes, plani. *Calyptra* submitræformis, subpilosa, basi lacera. *Capsula* æqualis, suberecta, brevipedicellata, exannulata. *Operculum* rostellatum. *Florescentia* dioica.—Folia *dense ac concinne disticha, equitantia, complicato-carinata, enervia, tenerrime lineari-areolata.* Plantæ *pulcherrimæ, siccæ aureæ coruscantes.*

1. Phyllogonium *elegans*, Hook. fil. et Wils.; caule repente, surculis breviusculis vage ramosis, ramis frondiformibus lanceolatis complanatis, foliis distiche patentibus arcte equitantibus oblongis obtusis complicato-carinatis integerrimis enerviis, perichætialibus brevioribus erectis, capsula turbinata suberecta lævi brevipedicellata, operculo convexo rostello recto, calyptra magna pilosa basi sulcata lacera, peristomii dentibus latis planis subbifidis pallidis siccitate erectis, columella longe exserta. (TAB. LXXXVIII. Fig. 6.)

HAB. Northern and Middle Islands; trunks of smooth-barked trees: Bay of Islands, *Sinclair, J. D. H., etc.* Cook's Straits, *Lyall.*

Surculi scarcely one inch long, the complanate branches about one line in breadth. *Leaves* with a rhomboidal profile, the upper part of the outline of each so blending with the rest, as to form an unbroken line along the margin of the frond; hence the apex of the leaf is concave and scyphiform, and the leaf cannot be flattened without rupture. *Seta* about as long as the fruit, sometimes much shorter. *Capsule* when dry and empty very wide-mouthed, with a very prominent columella. *Teeth* broad, almost membranous, apparently composed of four subdivisions, more or less closely united. *Calyptra* entirely covering the capsule. *Male* plant not seen.—In a barren state the branches are

narrower, and the leaves deciduous.—PLATE LXXXVIII. Fig. 6:—1, plant, *natural size;* 2, seta, with calyptra and perichætium; 3, mature capsule; 4, portion of peristomium; 5, leaves:—*all but fig.* 1 *magnified.*

Tribe XVII. NECKERACEÆ.

Gen. LI. NECKERA, *Bruch et Schimp.*

Peristomium duplex: *exterius,* dentes 16, lanceolato-subulati, intus trabeculati, vix hygroscopici: *interius,* processus 16, e membrana angusta carinato-plicata hyalina, cum dentibus alternantes. *Calyptra* cucullata, nuda. *Capsula* ovalis, æqualis, erecta, mollis, exannulata, immersa vel exserta.—Folia *octofariam cauli inserta, disticke complanata, obliqua, transverse undulata, nitida, tenuissime areolata.* Caulis *repens.* Surculi *erecti, pinnatim ramosi.*

1. Neckera *pennata,* Hedw.; monoica, foliis ovato-lanceolatis acuminatis apice serrulatis undulatis subenerviis, perichætialibus internis elongato-lanceolatis acuminatis, capsula immersa, operculo brevirostri, calyptra parva vix infra operculum producta.—*Hedw. Musc. Frond. v.* 3. *t.* 19. *Bruch et Schimp., Bryol. Europ.*

HAB. Northern Island: trunks of trees; Wangarei and Wairau, *Colenso.*

Very rarely found in Scotland, Ireland, and throughout Europe; abundant in North and South America, East Indies, etc.

2. Neckera *lævigata,* Hook. fil. et Wils.; monoica, surculo pinnatim ramoso, foliis ovatis obtusis integerrimis dorso lævigatis convexis (haud undulatis) nervo brevi, perichætialibus convolutis lanceolatis, capsula exserta brevipedicellata. (TAB. LXXXVIII. Fig. 3.)

HAB. Middle Island: Banks' Peninsula and Port Cooper, *Lyall.*

One inch in height. *Leaves* more loosely imbricated, full green, firm; nerve ceasing below the middle. *Capsule* just exserted, on a very short pedicel.—Allied to *N. Jamesoni,* Taylor; but that has the leaves acute and undulated.—PLATE LXXXVIII. Fig. 3:—1, plant, *natural size;* 2, portion of stem, perichætium, and capsule; 3, perichætium and capsule; 4, 5, leaves:—*all but fig.* 1. *magnified.*

Gen. LII. TRACHYLOMA, *Bridel.*

Peristomium duplex: *exterius,* dentes 16, angusti, subnodulosi, duri: *interius,* cilia totidem cum iis alternantia, e membrana brevi orta, angusta, carinata, nodulosa. *Calyptra* cuculliformis. *Capsula* erecta, oblonga, subæqualis, curvula, exannulata.—Folia *subenervia, complanata.* Habitus *dendroideus, caule repente, surculo superne pinnatim ramoso.*

The generic name is founded upon a mistaken view of the inner peristome: τραχυς, *rough,* and λωμα, *margin* (of the cilia). The peristome, especially as to the structure of the teeth, is that of *Neckera;* but the leaves, though complanate, are not oblique, and the habit is more dendroid. The cilia of the inner peristome are not at all lacunose, hence not in accordance with *Climacium* of Bruch and Schimper; and the pinnate ramification is also at variance with the definition of that genus, and in the peristome it differs from *Isothecium.*—For the present it is considered inexpedient to change the name given by Bridel.

1. Trachyloma *planifolium,* Hook.; dioicum, surculo erecto pinnatim ramoso, ramis complanatis, foliis disticke imbricatis erecto-patentibus ovatis apice serratis subenerviis, capsula erecta subcylindrica, operculo conico-subulato.—*Bridel, Bryol. Univ. t.* 2. *p.* 278. Neckera planifolia, *Hook. Musc. Exot. t.* 23 (*vix Hedw. Sp. Musc. t.* 48).

Hab. Northern and Middle Islands: Waikehi, *Sinclair.* Dusky Bay, Port Nicholson, Milford Sound, Thomson's Sound, and Bligh's Sound, *Lyall.*

About three inches in height (from a creeping rhizoma), bright shining green. *Leaves* sometimes with an exceedingly faint nerve one-third of their own length. *Seta* ½ inch or more, flexuose, sometimes arcuate at the top, as in Hedwig's figure. *Capsule* large, slightly curved or unequal. *Peristome* long, about one-third the length of the capsule; teeth pale yellow, incurved when dry. *Inner peristome* almost white. *Perichætial* leaves long and narrow, serrated. *Anictangium planifolium* of Hedwig, Sp. Musc., may be quite distinct, having leaves more tapering and more spreading; and in Herb. Hook. is a barren specimen from Java, given by Professor Nees, which seems the same as Hedwig's Moss, and different from the one above described. Schwægrichen, however, suspects that Hedwig's plant may be *Hypnum aciculare.*

Tribe XVIII. Isotheciaceæ.

Gen. LIII. ISOTHECIUM, *Bridel.*

Peristomium duplex: *exterius,* dentes 16, ut in *Hypno*: *interius,* membrana in processus 16 carinatos cum vel absque ciliis interpositis profunde divisa. *Calyptra* cuculliformis. *Capsula* erecta, æqualis vel e curvatura pedicelli cernua, subæqualis, annulata.—Habitus *dendroideus.* Rhizoma *repens.* Surculi *inferne nudi, rigidi, superne pinnatim ramosi.*

Bruch and Schimper restrict the definition of the genus. We here follow Bridel, admitting, however, that the group is susceptible of subdivision.

§ 1. *Fronde diffusa, suberecta.*

1. Isothecium *sulcatum,* Hook.; dioicum, surculo pinnatim ramoso, ramis confertis ramulosis, foliis confertis imbricatis suberectis ovatis obtusiusculis mucronulatis concavis (cymbiformibus) apice serrulatis solidinerviis dorso spinulosis, seta breviuscula, capsula cylindrica erecta sulcata, operculo subulato.—Leskea, *Hook. Musc. Exot. t.* 164. *Schwægr. Suppl. t.* 270. Clinacium sulcatum, *Bridel, Bryol. Univ.*

Hab. Northern Island: Bay of Islands and Auckland, *Sinclair, J. D. H., Colenso.* On trunks of Kikatea Pine-trees (barren).

An Australian Moss.—*Surculi* 2–3 inches long, with yellowish foliage. *Branches* crowded, numerous, the larger fronds bipinnate, in form subovate. *Leaves* concave, boat-shaped at the apex, the strong nerve spinulose at the back. *Fruit* inserted near the top (often on the branches) of the frond. *Seta* ¼ inch long. *Capsule* reddish, furrowed or octangular. *Peristome* in the original specimen yellow (not red); the outer teeth incurved when dry, faintly marked with a medial line, not trabeculate internally.—The original specimens in fruit do not well show the ramification.

2. Isothecium *Arbuscula,* Smith; dioicum, surculo bipinnato-ramoso, foliis imbricatis patentibus ovatis concavis integerrimis basi obsolete binerviis, seta breviuscula flexuosa, capsula ovata suberecta vel cernua, operculo conico.—Hookeria Arbuscula, *Smith, Linn. Trans.* Hypnum Arbuscula, *Hook. Musc. Exot. t.* 112. *Schwægr. Suppl. t.* 300.

Var. *β. deflexum;* surculo laxius ramoso arcuato deflexo apice radicante, foliis remotioribus acutioribus minus concavis.—H. deflexum, *Wils. MSS.*

Hab. Abundant throughout the Islands, on trees. Var. *β.* Middle Island, *Lyall.*

Also found in Tasmania.—*Surculi* 2 to 3 inches high, arising from a stout, woody, creeping rhizoma, bare of branches in the lower part, rigid. *Leaves* more or less concave, in the typical form inflated, more or less acute, in the var. *β.* tapering gradually; perichætial leaves longer and narrower. *Seta* about two lines long, thick, flexuose, often arcuate at the top, whence the capsule is more or less cernuous. *Capsule* variable, in some specimens straight and symmetrical, in others curved as in *Hypnum.*

This differs from *Hypnum cochlearifolium* chiefly in the rigid dendroid habit and firmer, less inflated, not obtuse leaves. Raoul's specimen (Herb. Musc. Paris, 24 b.) appears to be a state of this with more erect and less concave leaves. A similar form, with branches much fasciculate, was gathered by Dr. Lyall.

3. Isothecium *pulvinatum*, Hook. fil. et Wils.; dioicum, surculo humili pinnatim ramoso rarius arcuato, foliis sursum secundis erecto-patentibus rameis ovatis acuminulatis concaviusculis enervibus perichætialibus squarrosis, seta breviuscula, capsula ovata cernua, operculo conico. (Tab. LXXXVIII. Fig. 5.)

Hab. Northern Island, *Colenso.*

Surculus about one inch in height. *Frond* somewhat arcuate and deflexed; branches slender, slightly incurved. *Seta* four lines long, rather thick, arcuate above.—One third the size of the preceding, and essentially different in the upward direction of the leaves.—Plate LXXXVIII. Fig. 5:—1, 2, plants, *natural size;* 3, 4, capsules; 5, leaf:—*magnified.*

4. Isothecium *pandum*, Hook. fil. et Wils.; dioicum, surculo inferne nudo superne pinnatim ramoso arcuato deflexo, foliis distiche imbricatis complanatis ellipticis obtusiusculis crassinerviis apice serrulatis, seta breviuscula apice arcuata, capsula ovata subpyriformi, operculo rostrato. (Tab. LXXXIX. Fig. 1.)

Var. *β;* surculo majore, foliis magis oblongis siccitate subsecundis.

Hab. Northern and Middle Islands: Bay of Islands, *J. D. H.* East Cape, *Sinclair.* Otago, Hutt Valley, and Southern Island, *Lyall.* Var. *β.* Akaroa, *Raoul.*

A Tasmanian plant, closely allied to the European *Hypnum Alopecurum*, from which it differs in its smaller size, elliptic, obtuse (not tapering) leaves and thicker nerve, sometimes forming a very small mucro at the apex, areolæ roundish, dot-like. *Seta* half an inch long. *Capsule* short, seldom if ever bent, cernuous from the curvature of the seta.—Plate LXXXIX. Fig. 1:—1, plant, *natural size;* 2, capsule; 3, 4, leaves; 5, apex of leaf:—*all but fig.* 1 *magnified.*

§ 2. Hypnodendron.—*Surculus inferne nudus, rigidus, apice tantum ramosus. Rami in frondem horizontalem deltoideo-subrotundam dispositi, subradiati, plus minus pinnatim ramulosi. Innovationes e basi frondis latere orti.*

a. *Capsula lævis. Operculum conicum.*

5. Isothecium *Menziesii*, Hook.; dioicum, ramis umbellatis, foliis ovatis cuspidatis concavis margine dorsoque serratis nervo subexcurrente, seta elongata, capsula oblonga suberecta, operculo conico brevi.—Hypnum Menziesii, *Hook. Musc. Exot. t.* 33. *Schwægr. Suppl. t.* 222.

Hab. Northern, Middle, and Southern Islands: Dusky Bay, Chalky Bay, Milford Sound, and Port William, *Lyall.* Waikehi and Auckland, *Sinclair.*

A Tasmanian Moss.—*Surculus* about four inches long. *Seta* 2 to 3 inches. *Leaves* on the lower part of the surculus cordato-ovate, squarrose, much attenuated at the apex, almost piliferous; those of the branches slightly compressed; the nerve narrow, often vanishing below the cuspidate apex; areolæ narrow, subpapillose. *Capsule* subcylindrical, large, not contracted at the mouth, often erect, sometimes almost pendulous, symmetrical.

b. *Capsula striata. Operculum longirostre.*

6. Isothecium *spininervium*, Hook.; dioicum, comosum, ramis simplicibus complanatis, foliis appresso-patulis subdistiche imbricatis ovatis acutis margine dorsoque serratis solidinerviis, capsula oblonga sulcata cernua, operculo rostrato, capsula breviore.—Hypnum spininervium, *Hook. Musc. Exot. t.* 29. *Schwægr. Suppl. t.* 258.

Var. *β. arcuatum;* seta arcuata, caule breviore. Hypnum arcuatum, *Hedw. Sp. Musc. t.* 62. Pterygophyllum, *Bridel, Bryol. Univ. v.* 2. *p.* 348.

Hab. Throughout the Islands, from the Bay of Islands to Dusky Bay, *Sinclair, Lyall, etc.*

Found in Tasmania and Java.—From 1 to 3 inches in height or more. *Seta* ¾ inch to 1½ inch, straight in the larger specimens, often arcuate in the smaller ones. *Leaves* glossy, bright green, the intermediate ones smaller, appressed. *Capsule* sometimes curved.—*Hypnum Reinwardtii*, Hornschuch, from Java, differs in the narrower, more tapering, uniform leaves, longer seta, and longer operculum. The arrangement of the leaves in *I. spininervium* is analogous to that of *Racopilum.*

7. Isothecium *marginatum,* Hook. fil. et Wils.; dioicum, comosum, ramis subverticillatis pinnatim ramulosis vel simplicibus, foliis ovato-oblongis vel ovato-lanceolatis concaviusculis marginatis serrulatis dorso spinulosis solidinerviis, capsula subcylindrica curvata sulcata cernua, operculo rostrato. (Tab. LXXXIX. Fig. 2.)

Hab. Northern and Middle Islands; common in watery places.

Taller and less elegant than the last, with dull green foliage, shrinking and twisting when dry. Essentially distinguished by the margined, narrower leaves.—Plate LXXXIX. Fig. 2:—1, plant, *natural size;* 2, portion of stem and leaves; 3, leaf:—*both magnified.*

8. Isothecium *comosum,* Labillard.; dioicum, comosum, rámis subverticillatis pinnatim ramulosis, foliis patentibus subsecundis ex ovata basi subulato-setaceis rigidis serratis excurrentinerviis, capsula subcylindrica sulcata pendula, operculo longirostri.—*Labill. Pl. Nov. Holl. Schwægr. Suppl. t.* 91.

Var. *β*; foliis minoribus brevioribus minus serratis, nervo minus excurrente, seta breviore.

Hab. Northern and Middle Islands: Waikehi, *Sinclair.* Dusky Bay, *Lyall,* and in several intermediate localities. Var. *β*. Dusky Bay, *Menzies.*

A Tasmanian, Australian, and Javanese Moss.—Variable in size, 1–6 inches long, and in aspect; sometimes with several successive innovations and the whorls of branches crowded, in other cases with a single whorl or roundish horizontal frond at the summit of a stem densely covered with brown radicles. *Leaves* rigid, the stout nerve projecting as a rough bristly point of greater or less length. *Setæ* ¾–2 inches long, often numerous, aggregate from the centre of the frond. *Operculum* nearly as long as the capsule.—Approaches to some *Bartramiæ* in aspect. *Hypnum divaricatum,* Hornschuch, from Java, is nearly allied, but has shorter and wider leaves, nerve not excurrent.

9. Isothecium *gracile,* Hook. fil. et Wils.; dioicum, caule ramoso, ramis gracilibus recurvis, foliis erecto-patentibus secundis ellipticis concavis obtusiusculis subdenticulatis enerviis, perichætialibus squarrosis acuminatis, seta longiuscula lævi, capsula ovata cernua, operculo conico.—*Fl. Antarct. pt.* 1. *p.* 29. *t.* 61. *f.* 3.

Hab. Middle Island: Otago, *Mr. John Buchanan* (*Hb. Gourlie*).

Also found in Lord Auckland's Islands. Until fertile specimens were obtained, it was difficult to distinguish this Moss from *Pterogonium filiforme;* from which, in the structure of the peristome and cernuous capsule, it is essentially different.—*Annulus* large. *Seta* red, nearly 1 inch long.—Allied to *I. pulvinatum.*

Tribe XIX. Hypnaceæ.

Gen. LIV. HYPNUM, *Linn.*

Peristomium duplex: *exterius,* dentes 16, lanceolati, reflexiles, intus trabeculati, linea media notati; *interius,* membrana carinato-sulcata in processus 16 carinatos ciliis interpositis mediotenus fissa. *Calyptra* cuculliformis, glabra. *Capsula* inæqualis, arcuata, cernua, plerumque annulata, longe pedicellata.—Habitus *varius.* Caulis *plerumque repens, vage vel pinnatim ramosus.*

In this genus we retain all but the dendroid species with curved cernuous capsules, and the *Rhizogonia* of Bridel, with fructification at the rooting base of erect surculi.

§ 1. TAMARISCINA.—*Caule pinnatim ramoso, stupa viridi e fibris ramosis composita villoso.* Eriocladon, *Hook. fil. et Wils. MSS.*

1. Hypnum *furfurosum,* Hook. fil. et Wils.; dioicum, caule procumbente furfuroso laxe bipinnato, ramis gracilibus filiformibus, foliis cordato-acuminatis carinato-concavis integris evanidinerviis caulinis squarrosis rameis arcuato-erectis siccitate incurvis, perichætialibus majoribus erectis laciniato-ciliatis longe acuminatis, seta lævi, capsula oblonga cernua, operculo rostrato. (TAB. LXXXVIII. Fig. 7.)

Var. β; minus, foliis magis confertis, seta capsulaque brevioribus.

Var. γ; foliis laxioribus longioribus, capsula brevi.

Var. δ; ramis brevibus crebre pectinato-ramulosis, seta capsulaque longioribus.—H. Meyenianum, *Hampe, Ic. Musc. Nov.*?

HAB. Throughout the Islands, abundant, *Cunningham, Colenso, Lyall, etc.*

Found also in Tasmania, Australia, and Norfolk Island. Of smaller size than *H. recognitum*, Hedw., or any of the varieties of *H. proliferum,* and more nearly allied to *H. minutulum,* which differs in the monoicous inflorescence, and wider, more patulous leaves.—*Stems* slender, rigid; *branches* distant in the normal state and very slender; *leaves* yellowish, entire or scarcely denticulate at the apex, not papillose (dark green in the varieties), remarkably incurved when dry. *Seta* about an inch long, red. *Capsule* pale-brown. *Operculum* rather shorter than the capsule.—*H. versicolor*, Hornsch., from New Holland (Sieber) may be a state of this, with the branch-leaves more obtuse, and is perhaps *H. fuciforme,* Bridel. *H. toxarion,* Bridel, may refer in part to our species, but Schwægrichen's Moss from St. Domingo, so called, must be different. A barren specimen, gathered by Cunningham on decayed trees at the Bay of Islands, with leaves shorter, more concave, serrulate, the nerve prominent at the back and cristate, and more crowded branches, may belong to *H. proliferum,* but is not in a fit state to be determined.—PLATE LXXXVIII. Fig. 7:—1, plants, *natural size;* 2, capsule; 3, capsule, with the operculum removed; 4 and 5, leaves:—*all magnified.*

§ 2. ADUNCA.—*Foliis nervatis, falcatis.*

2. Hypnum *uncinatum,* Hedw.; monoicum, caule pinnatim ramoso, foliis circinato-falcatis confertis subulato-lanceolatis longissime attenuatis striatis evanidinerviis subserrulatis perichætialibus longissimis striatis, capsula oblonga cernua, operculo conico apiculato.—*Hedw. Frond. Musc. v.* 4. *t.* 25.

HAB. Northern Island: Huiarau River, *Colenso.* (A native of England.)

Found also in all Europe, North America, Staten Land, Kerguelen's Land, Hermite Island, Cape Horn, and other parts of South America.

3. Hypnum *Kneiffianum,* Schimper; dioicum, caule pinnatim ramoso suberecto, foliis laxe imbricatis subsecundis e basi deltoidea ovato-lanceolatis acuminatis concavis integerrimis seminerviis, capsula oblonga cernua, operculo conico.—H. aduncum *var., Auct.*

HAB. Northern Island, *Colenso.* A few scraps only. (A native of England.)

Also found in Europe and America. Differs from *H. aduncum* in the wider, less secund leaves, which are not striated, subcordate at the base; branches more distant.

4. Hypnum *hispidum,* Hook. fil. et Wils.; dioicum, caule arcuato vage vel subpinnatim ramoso, foliis imbricatis secundis e basi ovata subplicata longe subulato-setaceis integerrimis nervo crasso excurrente, seta lævi breviuscula, capsula ovata cernua, operculo curvirostro.—*Hook. fil. et Wils. in Fl. Antarct. pt.* 1. *p.* 28. *tab.* 61. *f.* 2.

HAB. Throughout the Islands; abundant in streams.

A native of Australia, Tasmania, Lord Auckland's Islands, and Norfolk Island.—Height 3–4 inches. *Stems* or *surculi* growing from a creeping rhizoma, branched only in the upper part, where the fructification is produced:

hence there is much affinity with *Isothecium*, and perhaps it may eventually rank between *I. pandum* and *I. comosum*. This Moss has a peculiar harsh bristly habit. *Capsule* short, the operculum of equal length. *Calyptra* white, small, coriaceous. *Male plants* more slender than the fertile ones.

§ 3. *Foliis seminerviis, patentibus, undique imbricatis.*

a. PRÆLONGA.—*Seta scabra; operculo rostrato.*

5. Hypnum *muriculatum*, Hook. fil. et Wils.; monoicum, caule procumbente subpinnatim ramoso, ramis brevibus simplicibus subcompressis, foliis patentibus cordato-ovatis acuminatis subserrulatis apice subpiliformi attenuatis nervo ultramedio, seta scabra breviuscula, capsula oblonga horizontali, operculo longirostri. (TAB. LXXXIX. Fig. 3.)

Var. β; ramis complanatis, foliis remotioribus minus acuminatis laxe reticulatis siccitate contractis tortilibus.

HAB. Northern and Middle Islands: Bay of Islands, *J. D. H.* Auckland, *Sinclair.* Akaroa, *Raoul.* Thomson's Sound and Port Underwood, *Lyall.* Var. β. Bay of Islands, *J. D. H.*

A small species, native of Tasmania and Norfolk Island.—*Stem* creeping, 1–2 inches long; *branches* $\frac{1}{4}$ inch. *Seta* nearly $\frac{1}{2}$ inch. *Capsule* suddenly bent at its junction with the seta, as in *H. prælongum*, an allied species, which is dioicous.—*H. scabrisetum*, Schwægr. (Suppl. t. 281 b.), from Nepal, closely allied, has narrower leaves, and the operculum is unknown.—PLATE LXXXIX. Fig. 3:—1, plant, *natural size;* 2, 3, capsules; 4, capsules with calyptra; 5, 6, leaves:—*all magnified.*

6. Hypnum *austrinum*, Hook. fil. et Wils.; monoicum, caule repente vage ramoso, ramis suberectis incurvis subsimplicibus, foliis patentibus subsecundis cordato-ovatis acutis concavis serrulatis nervo ultramedio perichætialibus erectis apice attenuatis, seta scabra, capsula ovata cernua, operculo rostrato. (TAB. LXXXIX. Fig. 4.)

Var. β; ramis confertis gracilioribus, foliis minoribus.

HAB. Northern and Middle Islands: Wellington, Port Nicholson, Milford Sound, and Chalky Bay, *Lyall.* Auckland, *Knight.* Akaroa, *Raoul.* Var. β. Middle Island, *Lyall.*

Larger than the last, and approaching in size, etc., to *H. megapolitanum.*—*Branches* 1 inch long. *H. clinocarpum*, Taylor, from Quito, may possibly be the same, but we have no specimen, and it seems to be dioicous.—PLATE LXXXIX. Fig. 4:—1, plant, *natural size;* 2, capsules; 3, calyptra; 4, portion of peristome; 5, portion of stem and leaves; 6, leaf:—*all magnified.*

7. Hypnum *remotifolium*, Grev.; hermaphroditum, caule vage subpinnatim ramoso, ramis elongatis, foliis patentibus cordato-ovatis acutis serratis nervo ultramedio, seta scabra, capsula cernua, operculo rostrato.—*Greville in Trans. Wern. Soc. Schwægr. Suppl. t.* 200.

HAB. Northern Island, *Sinclair* and *Colenso* (barren scraps only). Auckland, *Knight.*

A South American Moss.—A larger species than the last, with glossy leaves, not shrinking when dry. *Seta* (in the original specimen from Dr. Greville) rough, not smooth as in Schwægrichen's figure.—*H. speciosum*, Bridel, is closely allied, but has longer leaves.

b. CONFERTA.—*Seta lævi; operculo rostrato.*

8. Hypnum *confertum*, Smith; monoicum, caule vage ramoso, foliis cordato-ovatis serrulatis nervo ultramedio perichætialibus acuminatis suberectis, seta lævi, capsula ovato-oblonga cernua, operculo rostrato. —*Smith, Fl. Brit.*

Var. *majus;* caule ascendente subarcuato, foliis subsecundis concavis.

HAB. Northern and Middle Islands: Bay of Islands and Auckland, *Sinclair, J. D. H.* Jackson's Bay, Wellington, and Otago, *Lyall.* (A native of England.)

This species is distributed throughout Europe, North and South America. This is a large form, differing from var. *Megapolitanum* in the crowded incurved stems.—It is doubtful whether *H. Sellowii*, Hornsch. in Fl. Brasil., be more than a large form of this species, which seems to be variable according to climate and situation. *H. ulicon*, *H. scariosum*, and *H. conchophyllum*, Taylor, from Quito, probably belong to this.

c. Rutabula.—*Operculo conico; seta scabra.*

9. Hypnum *rutabulum*, Linn.; monoicum, caule vage ramoso, foliis laxe imbricatis patulis ovato-acuminatis ultranerviis subserrulatis, seta scabra, capsula ovata cernua, operculo conico.—*Hedw. Musc. Frond.* 4. *t.* 12.

Hab. Northern and Middle Islands: Bay of Islands, *J. D. H.* Akaroa, *Raoul.* Specimens few and imperfect. (A native of England.)

Common in Europe and in North and South America.

10. Hypnum *plumosum*, Schwægr.; monoicum, caule vage ramoso, ramis suberectis subincurvis, foliis imbricatis subsecundis ovato-lanceolatis concavis læviusculis ultranerviis apice subserrulatis, seta superne scabriuscula, capsula ovata subcernua, operculo conico acuto.—*Schwægr. Suppl. Hook. et Tayl.* H. pseudo-plumosum, *Bridel.*

Hab. Northern and Middle Islands: Bay of Islands, *J. D. H.* Bligh's Sound, *Lyall.* (A native of England.)

Common in Europe, North America, South America, and the East Indies.—Smaller than the last. *Leaves* less altered by drying, secund. *Seta* smooth below. *Operculum* very acute.

d. Serpentia.—*Operculo conico; seta lævi.*

11. Hypnum *riparium*, Linn.; monoicum, vage ramosum, foliis subcompressis laxe imbricatis ovato-lanceolatis integris nervo ultramedio, capsula ovata cernua, operculo conico.—*Hedw. Musc. Frond. v.* 4. *t.* 3.

Hab. Northern Island: Cape Turnagain, *Colenso.* A few barren scraps only. (A native of England.)

Very common in Europe and America.

12. Hypnum *serpens*, Linn.; monoicum, pusillum, vage ramosum, foliis laxis ovato-lanceolato-acuminatis laxe reticulatis nervo brevi vel ultramedio, capsula oblonga subcernua, operculo conico.—*Hedw. Musc. Frond. v.* 4. *t.* 18.

Hab. Northern Island: bogs at Hawke's Bay, *Colenso.* A few scraps only. (A native of England.)

Very common in Europe, America, and the Antarctic Islands.

13. Hypnum *sparsum*, Hook. fil. et Wils.; dioicum, caule bipinnato, ramulis brevibus gracillimis, foliis minutis patentibus ovatis evanidinerviis margine scabriusculis dorso vix papillatis siccitate incurvis, perichætialibus multo majoribus acuminatis attenuatis intimis laciniatis, seta lævi, capsula cernua oblonga. (Tab. LXXXIX. Fig. 5.)

Hab. Northern Island: Wangarei, *Col. Bolton.*

Resembles *H. minutulum* and *H. gratum*, but differs in the inflorescence.—*Nerve* of the leaf pellucid. *Seta* ½ inch long.—Plate LXXXIX. Fig. 5:—1, plant, *natural size;* 2, capsule; 3, perichætium and calyptra; 4, portion of stem and leaves:—*all magnified.*

§ 4. *Foliis squarrosis.*

a. Stellata.—*Capsula lævi.*

14. Hypnum *nodiflorum*, Wils.; monoicum, caule vage ramoso, foliis patulis subsquarrosis ovato-lanceolatis acuminatis integerrimis seminerviis, capsula oblonga cernua, operculo conico, floribus ♀ and ♂ aggregatis.—*Wils. MSS.*

Hab. Northern Island, *Colenso*. A few specimens only. (A native of England.)

Found in many parts of Europe and North America. This has been frequently confounded with *H. stellatum*, but is very distinct in the inflorescence.—*Leaves* less squarrose, of firmer texture, yellowish. *Nerve* variable, sometimes wanting. *Seta* 1–2 inches long.

15. Hypnum *relaxum*, Hook. fil. et Wils.; dioicum, caule procumbente vage subpinnatim ramoso, ramis erectis elongatis apice incrassatis, foliis confertis patulo-recurvis siccitate tortilibus subflaccidis ovato-acuminatis subintegris solidinerviis. (Tab. XC. Fig. 1.)

Hab. Northern Island, *Colenso*. Akaroa, *Raoul*. Wellington and Port Cooper, *Lyall*.

Branches about 1 inch long, erect. *Leaves* dull yellowish, subsecund, recurved, slightly carinate, subserrulate near the apex, nerve continued nearly or quite to the apex; areolæ oval, rather large, texture soft.—Plate XC. Fig. 1:—1, 2, plants, *natural size;* 3, portion of stem and leaves; 4, 5, leaves:—*all magnified.*

16. Hypnum *decussatum*, Hook. fil. et Wils.; dioicum, caule procumbente pinnatim ramoso, ramis simplicibus brevibus, foliis squarroso-recurvis ovatis longius acuminatis subintegris, nervo subcontinuo. (Tab. XC. Fig. 2.)

Hab. Northern Island: East Cape, *Sinclair*. Cape Turnagain and Hawke's Bay, *Colenso*.

Allied to *H. glaucocarpon*, Schwægr. (Suppl. t. 228), but is larger, has leaves nerved nearly or quite to the apex, and more acuminated.—*Stem* 3–4 inches long. *Branches* $\frac{1}{3}$ inch. *Leaves* yellowish, more squarrose than in *H. relaxum*, and not shrivelled when dry.—Plate XC. Fig. 2:—1, plant, *natural size;* 2, 3, 4, leaves:—*magnified.*

b. Ptychomnion, *Hook. fil. et Wils.*—*Capsula sulcata; calyptra magna, subinflata.*

17. Hypnum *aciculare*, Labillard.; dioicum, caule vage ramoso, ramis simplicibus elongatis crassis, foliis squarroso-patulis ovatis longius acuminatis apice inciso-serratis enerviis, capsula subcylindrica arcuata sulcata, operculo longirostri.—*Schwægr. Suppl. t.* 92.

Hab. In all the Islands; very common about the roots of trees in the woods.

Also found in Tasmania, Australia, the Antarctic Islands, Cape Horn, Staten Land, Juan Fernandez, Chiloe, Colchagua, and the Society Islands.—A very large Moss, height 2–10 inches. *Seta* $1\frac{1}{2}$ inch, purplish. *Capsule* acutely octangular. *Operculum* longer than the capsule, its beak slender. *Calyptra* large, chesnut-brown, coriaceous, at first somewhat inflated below. *Male flowers* numerous, axillary, red, on separate plants, more slender than the fertile. *Habit* peculiar, which may perhaps indicate its being a new genus.

§ 5. Cochlearifolia (Cœlidium, *Hook. fil. et Wils.*).—*Foliis valde concavis, obtusis, imbricatis, subenerviis.*

18. Hypnum *cochlearifolium*, Schwægr.; dioicum, caule elongato subrepente vage ramoso, ramis simplicibus erectis crassis, foliis patentibus imbricatis subrotundis obtusis sphærico-concavis integerrimis enerviis, perichætialibus vaginantibus, capsula ovata subcernua, operculo conico.—*Schwægr. Suppl.* 1. *v.* 2. *p.* 221. *t.* 88. H. flexile, *Hook. Musc. Exot. t.* 10 (*non Swartz, Fl. Ind. Occid.*). Isothecium flexile, *Bridel, ex parte.*

Var. β; caule subpendulo, ramis brevioribus, seta brevissima, crassa, capsula brevi subrotunda, operculo conico-acuminato.

Hab. Common in all the Islands: Dusky Bay, *Menzies, Lyall*. Bay of Islands and Auckland, *Colenso, Cunningham, Sinclair*. Akaroa, *Raoul*.

Found also in Tasmania and the Antarctic Islands.—*Branches* about 1 inch long. *Leaves* very broad, obtuse and inflated; areolæ narrow. *Seta* $\frac{3}{4}$ inch, arcuate above. *Capsule* almost symmetrical, oval, rather small. *Operculum* about half as long.—The var. β may easily be mistaken for a large robust state of *Leskea mollis*, Hedwig,

but the perichætium is shorter, and the shape and texture of the leaves are different; it is also Tasmanian. The *H. flexilis*, Swartz (Leskea flexilis, *Hedw. Sp. Musc. t.* 58), is a very different Moss, with an erect capsule and very hairy calyptra: it belongs to *Pilotrichum*, Bridel.

19. Hypnum *clandestinum*, Hook. fil. et Wils.; quasi-monoicum, caule repente, surculis erectis vage ramosis subincurvis rigidulis, foliis patulis imbricatis subrotundis obtusissimis inflato-concavis subenerviis perichætialibus subsquarrosis, seta breviuscula, capsula ovata cernua, operculo conico. (Tab. XC. Fig. 3.)

Hab. Middle Island: Port William, *Lyall.*

Also found in Tasmania. A smaller and more rigid Moss than the preceding, with greyish-green, less glossy foliage.—*Surculi* somewhat dendroid and incurved, bearing fruit in the upper part, about 1½ inch in height. *Leaves* very obtuse and concave, inflexed or cucullate at the summit, margin almost entire; areolæ narrow. *Seta* not half an inch long. *Male flowers* nidulant amongst or upon the leaves of the fertile stem.—In habit this differs considerably from the preceding species, and approaches the following.—Plate XC. Fig. 3:—1, 2, plants, *natural size;* 3, capsules; 4, 5, leaves:—*magnified.*

20. Hypnum *divulsum*, Hook. fil. et Wils.; surculis erectis rigidis vage ramosis, ramis subsimplicibus subincurvis, foliis patulis laxe imbricatis obovato-subrotundis concavis obtusiusculis minute serrulatis seminerviis areolis punctiformibus perichætialibus squarrosis, capsula ovata cernua, operculo conico-acuminato. (Tab. XC. Fig. 4.)

Hab. Middle Island: Port Cooper and Banks' Peninsula, *Lyall.* Barren scraps only.

A native of Tasmania.—Of the same colour as the last, but smaller and more rigid. *Leaves* less inflated, less obtuse, nerved nearly halfway, and the areolæ roundish. The male flowers appear to be nidulant, as in that.—*H. vagans*, Hornschuch, from New Holland, is allied, but has acute subapiculate leaves and dioicous inflorescence.—Plate XC. Fig. 4:—1, plant, *natural size;* 2, 3, leaves; 4, capsule and perichætial leaves:—*all magnified.*

21. Hypnum *chlamydophyllum*, Hook. fil. et Wils.; monoicum, caule prostrato vage ramoso, ramis simplicibus elongatis cuspidatis erectis, foliis patentibus imbricatis quadrato-rotundatis basi truncatis auriculatis integerrimis concavis, nervo brevi evanido, seta elongata, capsula ovato-oblonga, operculo conico. —*Fl. Antarct. pt.* 1. *t.* 61. *f.* 1.

Hab. Middle Island: Otago and Port William, *Lyall.* Northern Island, in several localities, *Colenso.*

Also found in Tasmania, Campbell's Island, Cape Horn. Differs from *H. cochlearifolium* in the inflorescence, and in the broad auriculate base of the leaf.

22. Hypnum *inflatum*, Hook. fil. et Wils.; surculis erectis parce ramosis tumidis acutiusculis, foliis confertis arcte imbricatis late ellipticis apiculatis concavis integerrimis enerviis apice reflexis. (Tab. XC. Fig. 5.)

Hab. Northern Island: Manawaki, *Colenso.*

Surculi 2–3 inches long, cæspitose or crowded, very tumid, their diameter nearly ⅕ inch. *Branches* few, erect. *Leaves* large, inflated, concave, membranaceous, closely imbricated, suberect, more crowded at short intervals along the stem.—A very singular Moss, barren. Allied to *Leskea maritima*, Hook. (Musc. Exot.), and to *Hypnum phleoides*, Bridel.—Plate XC. Fig. 5:—1, plant, *natural size;* 2, 3, leaves:—*magnified.*

§ 6. Cupressiformia.—*Foliis secundis, enerviis.*

23. Hypnum *cupressiforme*, Linn.; dioicum, caule decumbente vage pinnatimque ramoso, ramis incurvis, foliis circinato-falcatis secundisve ovato-lanceolatis acuminatis concavis enerviis, capsula subcylindrica subcernua, operculo conico cuspidato.—*Hedw. Musc. Frond. v.* 4. *t.* 33.

Var. β. *minus;* ramis gracilibus, foliis angustioribus pallidis, capsula suberecta brevi.

Hab. Northern Island: mouth of Thames, *Sinclair, Colenso;* large form of the species, with yellowish leaves. Var. β. Port Nicholson, *Sinclair.* (A native of England.)

A common European, American, and Tasmanian Moss. Variable in size and aspect; it may be distinguished from its allies by the texture of the leaf, and especially by the cluster of enlarged opaque areolæ at the marginal base.

24. Hypnum *gracile,* Hook. fil. et Wils.; dioicum, caule ramoso, ramis gracilibus recurvis, foliis imbricatis secundis ellipticis obtusiusculis concavis subdenticulatis subenerviis, perichætialibus squarrosis, seta lævi, capsula cernua oblonga, operculo conico.—*Fl. Antarct. t.* 61. *fig.* 3. H. gracilescens, *C. Müller.*

Hab. Middle Island: Otago, *Herb. Gourlie.*

In habit resembling *Pterogonium filiforme,* but essentially different in the cernuous capsule and in the peristome. *Annulus* large. *Seta* nearly 1 inch long.—Also found in Lord Auckland's Island.

25. Hypnum *patale,* Hook. fil. et Wils.; dioicum, caule procumbente pectinatim ramoso, ramis superne planiusculis confertis patulis, foliis lateralibus distiche patulis omnibus falcato-secundis ovato-lanceolatis acuminatis apice subserrulatis enerviis perichætialibus setaceo-acuminatis erectis serratis, seta elongata, capsula ovato-oblonga horizontali, operculo convexo apiculato. (Tab. XC. Fig. 6.)

Hab. Northern Island: Bay of Islands, *J. D. H.* Waikehi, and Great Barrière Inlet, *Sinclair.* Port Nicholson, *Lyall.* Auckland, *Knight.*

Found also in Tasmania and Juan Fernandez.—*Stems* more elegantly and closely pinnate than in the preceding. *Branches* widely spreading. *Leaves* whitish, remarkably pale, glossy, widely spreading, the base marked with two yellow spots. *Seta* 1½ inch long, slender, reddish. *Capsule* rather small, more cernuous. *Operculum* short, bluntish, never cuspidate.—Plate XC. Fig. 6:—1, plant, *natural size;* 2, capsule; 3, 4, 5, leaves:—*all but fig.* 1 *magnified.*

25. Hypnum *Sandwichense,* Hook. et Arn.; monoicum, caule procumbente pinnatim ramoso, foliis lateralibus distiche patulis omnibus falcato-secundis ovato-lanceolatis acuminatis apice serrulatis basi binerviis margine haud reflexis perichætialibus serrulatis, capsula pendula ovata brevi, operculo convexo apiculato.—*Hook. et Arn. in Bot. Beechey, p.* 109.

Hab. Northern Island: Bay of Islands; on trunks of trees, rare, *J. D. H., Colenso.*

A Sandwich Island small species.—*Stem* 1 inch long. *Branches* short, not crowded. *Seta* ½ inch.—*H. Chamissonis,* Hornsch., from Radack Archipelago, is closely allied, but in that the leaves are more membranous, not widely spreading, and the margin is reflexed; capsule smaller, on a very slender pedicel; the operculum also is said to have a short subulate beak.

26. Hypnum *mundulum,* Hook. fil. et Wils.; monoicum, caule procumbente pinnatim ramoso flexili, ramis confertis erecto-patentibus, foliis eleganter circinato-falcatis angustis e basi ovata lanceolata longe piliformi-acuminatis enerviis, seta gracili, capsula ovali subpendula, operculo rostrato. (Tab. XCI. Fig. 1.)

Hab. Middle Island, *Lyall.*

A very elegant species, larger than the last. *Leaves* much narrower, and more piliform than in the *H. leptorhynchum,* pale green. *Seta* ½ inch long, red. *Capsule* purplish-brown, with an operculum of the same length and colour. *Perichætial leaves* rather short, moderately acuminate, subserrulate, erect.—Plate XCI. Fig. 1:—1, plant, *natural size;* 2, capsule and operculum; 3, capsule with operculum removed; 4, calyptra; 5, 6, leaves:—*all but fig.* 1 *magnified.*

27. Hypnum *leptorhynchum,* Brid.; monoicum, caule repente subpinnatim ramoso, foliis falcato-secundis lineari-lanceolatis acuminatis siccitate torquescentibus apice serrulatis enerviis margine subreflexis,

seta gracili lævi, capsula oblonga nutante, operculo longirostri.—*Bridel, Bryol. Univ. v.* 2. *p.* 621. *Schwægr. Suppl. t.* 93.

HAB. Throughout the Islands, *Colenso, Lyall, etc.;* common on trunks of trees, *J. D. H.*

A native of Tasmania, Australia, the Antarctic Islands, Isle of Bourbon, South America, and South Africa.—Smaller than *H. Sandwichense;* branches more slender and delicate; leaves narrower and more attenuated, shorter than in *H. mundulum,* and less circinate. *Operculum* with a long, slender beak, exceeding the length of the capsule.—*H. callidum,* Mont. (Cent. 5, 7), from Chili, seems to be the same species, according to the description, while his *H. leptorhynchum* appears to correspond with our *H. amœnum* (Fl. Antarct. pt. 1). Schwægrichen's figure of *H. leptorhynchum* tolerably well represents our Moss so called.

28. Hypnum *cerviculatum,* Hook. fil. et Wils.; dioicum, caule repente subpinnatim ramoso, foliis falcato-secundis lanceolatis acuminatis apice serrulatis attenuatis margine vix reflexis enerviis perichætialibus ovato-lanceolatis apiculatis serratis erectis, seta breviore crassa scabriuscula, capsula oblonga horizontali basi strumulosa exannulata, operculo longirostri.—Hypnum leptorhynchum, var. *β*, *Hook. fil. et Wils. in Fl. Antarct. pt.* 1. (TAB. XCI. Fig. 2.)

HAB. Northern Island: Port Nicholson, *Sinclair.* Woods, Tehawera, *Colenso.*

Found also in Lord Auckland's Islands and Tasmania.—Essentially different from the preceding in the inflorescence and roughish seta. *Leaves* wider, and more like those of *H. amœnum. Seta* about $\frac{1}{3}$ inch long.—*H. scorpiurum,* Mont. (Cent. 5, 6), appears to be closely allied, according to the description.—PLATE XCI. Fig. 2:—1, plant, *natural size;* 2, capsule and operculum; 3, capsule with operculum removed; 4, calyptra; 5, 6, leaves:—*all but fig.* 1 *magnified.*

29. Hypnum *tenuirostre,* Hook.; monoicum, caule repente divisionibus subpinnatim, ramoso, ramis erectis elongatis, foliis falcato-secundis confertis ovato-lanceolatis acuminatis concavis subintegerrimis enerviis, capsula ovato-oblonga cernua, operculo longirostri.—*Hook. Musc. Exot. t.* 111.

HAB. Middle Island: Bligh's Sound, Chalky Bay, and Otago, *Lyall.*

A Tasmanian plant, and a larger species than *H. cerviculatum,* with branches $\frac{3}{4}$ inch long or more. Foliage usually dark green, often lurid. *Seta* as long as the branches.

30. Hypnum *crassiusculum,* Bridel; monoicum, caule repente vage ramoso, ramulis brevibus incurvatis, foliis laxe imbricatis subsecundis lanceolatis acuminatis concavis margine reflexiusculis integerrimis, capsula ovato-oblonga subcernua, operculo longirostri.—*Bridel, Mant. Musc. Schwægr. Suppl. t.* 91. Isothecium crassiusculum, *Bridel, Bryol. Univ. v.* 2. *p.* 384. Leskea cæspitosa, *Hedw. Spec. Musc. t.* 49? (*non Swartz, Fl. Ind. Occid., fide Swartz in Herb. Hook.*)

HAB. Northern Island: Auckland, *Sinclair.*

Also found in the West Indies, North and South America, and Tristan d'Acunha. The Bridelian species is said to be dioicous, but the Moss before us, which abounds near New Orleans, etc., and which we cannot refer so confidently to any other described species as to this, is certainly monoicous. Perhaps *Leskea Duisaboana,* Mont. (Cent. 5, 16), from Mauritius, may be the same as ours, according to the description; compare also *L. acidodon,* Mont. (Cent. 5, 15), from the Isle of Bourbon.

31. Hypnum *pubescens,* Hook. fil. et Wils.; dioicum, caule laxe subpinnato, ramis remotiusculis, foliis patentibus laxe imbricatis vix secundis deltoideo-ovatis acuminatis serrulatis subenerviis, capsula cernua ovata brevi, operculo conico-acuminato subrostellato, capsula æquali, calyptra pilosiuscula. (TAB. XCI. Fig. 3.)

HAB. Northern Island: Auckland, *Sinclair* (Herb. Gourlie).

Closely allied to *H. molluscum,* and perhaps only a variety.—*Stems* more loosely and irregularly pinnate. *Leaves*

more distant and wide-spreading, more evidently serrulate, with longer points, obscurely striated when dry, membranous; areolæ wider, rhomboid; capsule shorter and smaller; operculum longer. *Seta* $\frac{1}{3}$ inch long.—PLATE XCI. Fig. 3:—1, plant, *natural size;* 2, capsule; 3, calyptra; 4, portion of stem and leaves; 5, apex of leaf:—*all but fig.* 1 *magnified.*

§ 7. *Foliis distiche imbricatis vel compressis, piliferis, enerviis.*

32. Hypnum *crinitum,* Hook. fil. et Wils.; dioicum, caule procumbente elongato inordinate pinnatimque ramoso, ramis remotis patentibus planiusculis subpinnatis acutis, foliis subcompressis erecto-patentibus concavis e basi oblongo-ovata obtusa longe piliferis subserrulatis enerviis, seta elongata lævi, capsula ovata cernua, operculo conico.—H. filiferum, *Taylor, MSS.* H. extenuatum? *Bridel, Bryol. Univ. v.* 2. *p.* 484. (TAB. XCI. Fig. 4.)

HAB. Northern Island, *Oldfield, Colenso.* Auckland, *Knight.*

Found in Tasmania and Australia.—*Stems* 2 to 5 inches long, or more; branches $\frac{1}{2}$ inch. *Leaves* pale, shining green, the piliform apex as long as the rest of the leaf. *Seta* 1 to 2 inches long.—*H. tanytrichum,* Mont. (Cent. 5, 4), from Java, may be the same, but the leaves are described as obovate, which is at variance with our Moss. Bridel's species is described from barren specimens gathered in New Holland.—PLATE XCI. Fig. 4:—1, plant, *natural size;* 2, capsule; 3, capsule with operculum removed; 4, 5, leaves; 6, apex of leaf:—*all but fig.* 1 *magnified.*

33. Hypnum *politum,* Hook. fil. et Wils.; dioicum, vage ramosum, ramis elongatis procumbentibus compressis, foliis distiche imbricatis lateralibus patentibus cæteris appressis omnibus oblongis compresso-carinatis subpiliferis integerrimis enerviis, seta longiuscula lævi, capsula oblonga horizontali, operculo conico-rostellato.—*Hook. fil. et Wils. in Lond. Journ. Bot., et Fl. Antarct. t.* 154. *f.* 2. Phyllogonium callichroum, *Mont. Cent.* 5. 2 (*non Bridel, Bryol. Univ. pt.* 2. *p.* 673).

HAB. Northern Island, *Colenso.* (A few scraps only of the male plant.)

A native of Tasmania, Chili, Cape Horn and Kerguelen's Land.—Tasmanian specimens in a perfect state have branches an inch long.—*Leaves* very glossy, bright green, crowded and much compressed, so as to appear distichous, but they are not so in their insertion. *Seta* 1 inch long. *Operculum* above half the length of the capsule. *Calyptra* white, coriaceous, dimidiate, smooth.

Tribe XX. OMALIACEÆ.

Gen. LV. OMALIA, *Bridel.*

Peristomium duplex, ut in *Hypno. Capsula* ovata, cernua, longipedunculata, annulata. *Operculum* rostratum. *Calyptra* dimidiata.—Caulis *repens, stolonifer.* Surculi *ascendentes, pinnatim vel irregulariter ramosi.* Folia *octofariam inserta, distiche imbricata, complanata, lateralia obliqua asymmetrica, basi uno latere inflexa cæterum plana, verticalia, reticulatione minuta, nervo brevi vel obsoleto.* Flores *monoici vel dioici.*

In habit approaching very near to *Pterygophyllum,* Bridel, but distinguished by the calyptra, which is truly dimidiate.

1. Omalia *pulchella,* Hook. fil. et Wils.; dioica, surculo pinnatim ramoso rigido, ramis compressis subramulosis, foliis distiche imbricatis complanatis confertis obovato-subrotundis acutiusculis serrulatis seminerviis perichætialibus squarrosis apice lingulatis, seta lævi apice arcuata, capsula ovato-subrotunda nutante, operculo rostrato.—Hookeria punctata, *Hook. fil. et Wils. in Lond. Journ. Bot.* 1844. (TAB. XCI. Fig. 5.)

HAB. Northern and Middle Islands: Bay of Islands; on smooth trunks, common, *J. D. H.* Milford Sound and Port Nicholson, *Lyall.* Auckland, *Knight.*

A Norfolk Island Moss.—*Surculi* an inch long, often bipinnate. *Leaves* light green, not glossy, crowded and

closely complanate, not altered by drying; areolæ punctate. *Seta* ⅓ inch long, red. *Calyptra* white, of thick and firm texture. *Operculum* as long as the capsule, with a curved beak.—PLATE XCI. Fig. 5:—1, plant, *natural size;* 2, capsule with calyptra; 3, capsule with calyptra removed; 4, 5, leaves:—*all but fig.* 1 *magnified.*

2. Omalia *oblongifolia,* Hook. fil. et Wils.; surculo bipinnatim ramoso, ramis attenuatis, foliis distiche imbricatis minus compressis subsecundis spathulato-oblongis acutiusculis siccitate undulatis nervo crasso ultramedio, capsula ovato-subrotunda nutante.—Hookeria punctata, var. β, *Hook. fil. et Wils. in Lond. Journ. Bot.* 1844. (TAB. XCI. Fig. 6.)

HAB. Northern Island: Bay of Islands; growing with the preceding, *J. D. H.* Auckland, *Knight.*

Of deeper green colour than *O. pulchella;* leaves longer and undulated when dry, less evidently serrulate at the apex, or entire; branches more numerous, and attenuated.—PLATE XCI. Fig. 6:—1, plant, *natural size;* 2, capsule; 3, capsule with operculum removed; 4, 5, 6, leaves:—*all but fig.* 1 *magnified.*

3. Omalia *falcifolia,* Hook. fil. et Wils.; dioica, surculo vage subpinnatim ramoso, ramis complanatis subsimplicibus, foliis distiche imbricatis oblongo-acinaciformibus obtusis enerviis integerrimis, seta lævi, capsula elliptico-oblonga nutante, operculo conico.—Hypnum falcifolium, *Hook. fil. et Wils. in Lond. Journ. Bot.* 1844. (TAB. XCII. Fig. 1.)

HAB. Northern Island: Bay of Islands, *Colenso.* Port Nicholson, *Lyall.* Auckland, *Sinclair.*

Branches about ½ inch long, few. *Leaves* very glossy, bright green, crowded, oblong, acinaciform at the apex. *Seta* above ½ inch long. *Perichætial leaves* erect, long, slender. *Outer peristome* yellow. *Male flowers* not observed. PLATE XCII. Fig. 1:—1, plant, *natural size;* 2, moist, and 3, dry capsule; 4, operculum; 5, portion of stem and leaves; 6, leaf:—*all but fig.* 1 *magnified.*

4. Omalia *auriculata,* Hook. fil. et Wils.; dioica, surculo repente divisionibus bipinnatis dilatatis, ramulis obtusis incrassatis, foliis subsecundis concavis obovato-subrotundis obtusiusculis basi auriculatis mediotenus nervatis, nervo valido bifurco. (TAB. XCII. Fig. 4.)

HAB. Northern Island: Auckland, *Knight.* (Male plant.)

Nearly allied to *O. pulchella,* more robust; leaves yellowish, larger, wider, convex and glossy at the back.—PLATE XCII. Fig. 4:—1, plant, *natural size;* 2, portion of stem and leaves; 3, leaf:—*both magnified.*

Tribe XXI. RHIZOGONIACEÆ.

Gen. LVI. RHIZOGONIUM, *Bridel.*

Peristomium Hypni. *Calyptra* subulata, dimidiata. *Capsula* inclinata, longipedunculata. *Operculum* plerumque rostratum.—Surculi *subsimplices, erecti, subcompressi, cæspitosi.* Fructus *basilaris.* Florescentia *dioica.* Folia *rigida, duplici serie spinuloso-serrata.*

The double row of spinous teeth on the margin of the leaf is analogous to that of *Mnium,* one species of which genus (*Hypnum acanthoneuron,* Schwægr. Suppl. t. 258 *b, Bryum Menziesii,* Hook. Bot. Miscell. t. 19) C. Müller has added to this, in opposition to the opinion of Schimper, who on his part seems to have erred in uniting *H. spininervium* to *Rhizogonium. Rhizopelma,* C. Müller, is founded on *Leskea Novæ-Hollandiæ,* of which he had seen only barren specimens.

1. Rhizogonium *distichum,* Brid.; dioicum, foliis distichis ovato-oblongis obtusiusculis apice dentatis, nervo crasso sub apicem evanido, capsula oblonga horizontali, operculo conico-rostellato.—*Bridel, Bryol. Univ.* Hypnum distichum, *Schwægr. Suppl. t.* 87.

HAB. Northern and Middle Islands: shores of Waikare Lake, *Colenso.* Bligh's Sound, Auckland, Chalky Bay, Ship Cove, and Jackson's Bay, *Lyall, Knight, Sinclair, etc.*

A Tasmanian plant.—*Surculi* ½ inch long. *Leaves* dark dull green, of firm texture, with hexagonal areolæ, not margined; nerve very thick at the base, tapering upwards. *Seta* one inch long, rather thick.

2. Rhizogonium *Novæ-Hollandiæ*, Brid.; dioicum, foliis distichis vix marginatis oblongo-ovatis denticulatis nervo valido excurrente breviter cuspidatis, capsula oblonga horizontali, operculo rostrato.—Leskea Novæ-Hollandiæ, *Schwægr. Suppl. t.* 83.

HAB. Northern and Middle Islands: Port William and Port Nicholson, rare, *Lyall, etc.*

A Tasmanian, Lord Auckland's Island, and Australian Moss. More elegant than the last.—*Leaves* glossy, yellowish-green, somewhat pellucid, occasionally secund, usually distichous and complanate, rigid, obscurely margined at the base, scarcely so at the apex; areolæ guttulate, rather large. *Capsule* pale red, deep red at the mouth. *Seta* reddish, one inch long. *Operculum* nearly as long as the capsule. *Inner peristome* with very short cilia, two together. *Annulus* large.—Very few specimens are in the collection, and mostly incomplete.

3. Rhizogonium *pennatum*, Hook. fil. et Wils.; dioicum, foliis distichis patulis oblongo-lanceolatis marginatis nervo valido excurrente cuspidatis integerrimis, capsula ovata basi attenuata inclinata annulata, operculo conico-rostellato. (TAB. XCII. Fig. 2.)

HAB. Middle Island: Dusky Bay, *Menzies*. Port Preservation, *Lyall*.

Still more elegant than the last.—*Surculi* 1 inch long, slender. *Leaves* shining, very pale yellowish-green, subdiaphanous; margin thickened; nerve more excurrent. *Capsule* small, suberect, almost turbinate. *Operculum* nearly as long as the capsule. *Inner peristome* with short cilia.—PLATE XCII. Fig. 2:—1, 2, plants, *natural size*; 3, capsule; 4, leaf:—*both magnified.*

4. Rhizogonium *bifarium*, Hook.; dioicum, surculo superne ramoso, foliis distantibus distichis patentibus ovato-lanceolatis concaviusculis submarginatis solidinerviis duplici serie spinuloso-serratis, capsula ovata horizontali, operculo conico-acuminato subrostellato.—Hypnum bifarium, *Hook. Musc. Exot. t.* 57. Isothecium bifarium, *Bridel, Bryol. Univ. pt.* 2. *p.* 356.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies*. Hutt Valley, Milford Sound, and Port Preservation, *Lyall*. Waikehi and Auckland, *Sinclair*. Akaroa, *Raoul*.

Found also in Lord Auckland's Island.—*Surculi* ¾ inch long, slender, bearing fruit about midway, not at the base. *Branches* few, subfasciculate and curved to one side, slender, the rachis zigzag. *Leaves* dull green, of firm texture, the margin thickened towards the base, and more or less so to the apex. *Seta* ½ inch long, slender, curved at the top. *Capsule* small, roundish-ovate. *Operculum* shorter than the capsule.

5. Rhizogonium *spiniforme*, Linn.; foliis laxe imbricatis patentibus rigidis lineari-subulatis marginatis excurrenti-nerviis duplici serie spinoso-serratis, seta basilari elongata, capsula oblonga arcuata horizontali, operculo rostrato.—*Hedw. Musc. v.* 3. *t.* 25. Hypnum spiniforme, *Bridel, Bryol. Univ. v.* 2. *p.* 557.

HAB. Northern Island: Bay of Islands, *Cunningham*.

A native of Tasmania, the Antarctic Islands, Norfolk Island, South America, West Indies, Sandwich and Pacific Islands, Florida, Mexico, East Indies, Philippine Islands, Java, Ceylon, and South Africa.—*Surculi* 1 to 3 inches high. *Leaves* rigid, and sharply serrate, both on the edges and at the back, yellowish-brown or reddish.

6. Rhizogonium *mnioides*, Hook.; foliis erecto-patentibus basi decurrentibus lanceolato-subulatis anguste marginatis duplici serie dentatis solidinerviis siccitate tortilibus, seta elongata basilari, capsula ovata subcernua, operculo rostrato.—Hypnum mnioides, *Hook. Musc. Exot. t.* 77. *Bridel, Bryol. Univ. p.* 559. Hypnum subbasilare, *Schwægr. Suppl. t.* 256.

HAB. Mountains of the Northern Island, *Colenso*. Middle Island: Dusky Bay, *Menzies, Lyall*.

Found in Tasmania, the Antarctic Islands, and throughout South America, from Cape Horn to New Granada.

—*Surculi* ½ inch to 1 inch long. *Leaves* dull, dark green, wider and much less rigid than in the preceding, twisting when dry, the sides folding together. *Capsule* shorter. *Seta* 1½ inch long, inserted near the base of the surculus.

Gen. LVII. HYMENODON, *Hook. fil. et Wils.*

Peristomium simplex. *Dentes* 16, membranacei, æquidistantes, lineari-subulati, planiusculi, fugaces, apicibus cohærentes, membrana basilari angusta connexi. *Calyptra* dimidiata. *Capsula* suberecta. *Operculum* rostratum. *Florescentia* dioica.—Folia *disticke imbricata, elliptica, plana, pilifera, papillosa, areolis subrotundis, minutis.* Habitus *Rhizogonii.* Vita *arborea, præsertim ad truncos Filicum arborescentium.*

According to C. Müller (Bot. Zeit. Nov. 1847), the peristome is internal, but its origin from the sporular sac seems to us to be very questionable. Better specimens are wanted for further examination.

1. Hymenodon *piliferus,* Hook. fil. et Wils.; dioicus, surculis simplicibus, foliis laxe disticheque imbricatis patentibus elliptico-oblongis planis longe piliferis evanidinerviis papillosis margine crenulatis perichætialibus lanceolato-acuminatis erectis, seta elongata basilari gracili, capsula inclinata ovali ore coarctata. —Hypnum Mougeotianum, *D'Urville?* (Tab. XCII. Fig. 3.)

Hab. Northern Island: Bay of Islands, *Sinclair, Colenso;* common on the trunks of *Cyathea dealbata,* but not observed elsewhere, *J. D. H.*

Also found in Tasmania.—*Surculi* ⅓ inch long. *Leaves* light verdigris or subglaucous green, not at all glossy, moistened in water with difficulty; the piliform apex nearly as long as the rest of the leaf; nerve vanishing below it; reticulation almost granular, brittle; the areolæ roundish, prominent and papillose on both sides. *Seta* nearly 1 inch long, reddish. *Capsule* slightly contracted at the mouth. *Teeth* of the peristome long, white, fugacious, longitudinally striated, and transversely but faintly articulate. *Young calyptra* white, small.—The Brazilian *H. æruginosus* has narrower leaves and the nerve excurrent. *H. sericeus,* C. Müller, from Java, is described with glossy leaves and excurrent nerve.—Plate XCII. Fig. 3:—1, plant, *natural size;* 2, capsule; 3, part of peristome; 4, calyptra; 5, portion of stem; 6, 7, leaves:—*all but fig.* 1 *magnified.*

Tribe XXII. Hypopterygieæ.

Gen. LVIII. HYPOPTERYGIUM, *Bridel.*

Peristomium Hypni. *Calyptra* conico-subulata, plerumque latere fissa. *Capsula* æqualis, longe pedunculata, cernua vel pendula. *Operculum* e basi convexa rostratum.—Caulis *repens.* Surculi *dendroidei, pinnatim ramosi, complanati.* Folia *tristicha, lateralia pterygoidea, obliqua, verticalia, dorsalia* (tegmina dicta) *minora aliterque conformata, subappressa.*

The fructification in this and in the two following genera is lateral, underneath the proper leaves, not (as Bridel supposed) in the axillæ of the accessory or dorsal leaves.

1. Hypopterygium *filiculæforme,* Brid.; dioicum, surculo tripinnatim ramoso inferne nudo, ramis densis attenuatis, foliis distichis patentibus oblique cordato-ovatis evanidinerviis apice subserrulatis, tegminibus subrotundis acuminulatis, capsula ovata pendula, operculo rostrato.—*Bridel, Bryol. Univ. pt.* 2. *p.* 712. Leskea filiculæformis, *Hedw. Sp. Musc. t.* 50. Hypnum filiculæforme, *Schwægr. Suppl. t.* 281 a.

Hab. Northern and Middle Islands: Bay of Islands, *J. D. H.* Ruahine range, *Colenso.* Wellington, Hutt Valley, Ship Cove, and Otago, *Lyall.* Akaroa, *Raoul.*

Surculus 3 inches long, the frond widely ovate, or deltoid, or roundish, the principal divisions radiating from a centre, tripinnate, the branches very numerous. *Leaves* deep green, small. *Seta* rather short, not half an inch long.

Operculum nearly as long as the capsule. *Peristome* yellow, the inner one furnished with cilia. *Calyptra* dimidiate, not mitriform.

2. Hypopterygium *rotulatum,* Hedw.; monoicum, surculo bipinnatim ramoso inferne nudo, ramis horizontaliter radiatis, foliis distiche imbricatis patentibus rotundo-ovatis subflaccidis (siccitate crispulis undulatis) marginatis evanidinerviis apice subdenticulatis, tegminibus subrotundis acuminulatis brevissime nervatis, capsula pendula, operculo rostrato.—Leskea rotulata, *Hedw. Sp. Musc. t.* 51. *Bridel, Bryol. Univ. pt.* 2. *p.* 713?

Hab. Northern Island: Auckland, *Sinclair.* Southern Island, *Lyall.*

Also found in the Mauritius. In the absence of authentic specimens, it is almost impossible to ascertain whether this or the following species be the one intended by Hedwig. The figure of *Leskea rotulata* does not well exhibit the ramification, but we refer this Moss to that species because it is the only one in which the accessory leaves can be considered nerveless.—*Surculus* ½ inch long, or more. *Leaves* dull green, not crowded, more loosely reticulated than in the following, much undulated and crisped when dry; nerve ceasing halfway up the leaf. *Perichætial leaves* ovate-lanceolate, acuminate, concave. *Inner peristome* with cilia.—*H. laricinum,* Hook., differs in the larger size and leaves not bordered.

3. Hypopterygium *Smithianum,* Hook. fil. et Wils.; dioicum, surculo bipinnatim ramoso inferne nudo, foliis distichis ovato-subrotundis acuminulatis concaviusculis deflexis marginatis evanidinerviis apice denticulatis, tegminibus subrotundis acuminulatis solidinerviis, perichætialibus lanceolato-acuminatis, capsula pendula, operculo rostrato.—Hookeria rotulata, *Smith, in Linn. Trans. v.* 9. *p.* 279 (*non Hedw. Sp. Musc.*). H. pallidisetum, *Wils. MSS.*

Var. *β. minus;* foliis densius imbricatis deflexis subsecundis.—Hypopterygium rotulatum, var. *β,* incurvum, *Bridel?*

Hab. Throughout the Islands. Var. *α.* Dusky Bay, *Menzies.* Bay of Islands, *Cunningham, etc.* East coast and interior, *Colenso, Sinclair.* Port William, *Lyall.* Var. *β.* Bay of Islands; at the roots of trees, *J. D. H.* Port Nicholson, *Sinclair.* Rangitikei River, *Colenso.*

A Tasmanian Moss, essentially distinguished from the preceding by the dioicous inflorescence, and by the continuous nerve of the accessory leaves.—*Leaves* more obtuse and concave, of firmer texture, more evidently margined, more or less deflexed, bending over the accessory leaves, pale yellowish-green (but a dull green variety of this with softer leaves, crisped when dry, is found in Norfolk Island, and may be mistaken for the true *H. rotulatum*).—*Seta* and capsule pale reddish. *Calyptra* dimidiate. *Inner peristome* with cilia.—Very probably this species has been confounded with the preceding by Bridel and others.

4. Hypopterygium *setigerum,* P. Beauv.; dioicum, surculo bipinnatim ramoso inferne nudo, ramis radiatis horizontalibus, foliis ovatis acuminulatis spinuloso-serratis evanidinerviis, tegminibus ovatis longius acuminatis spinoso-ciliatis, setulis intrafoliaceis aciculiformibus tegminibus longioribus, capsula pendula brevipedunculata basi tuberculata, operculo longirostri.—Hypnum setigerum, *P. Beauv. Prodr. Ætheog. p.* 70. Leskea tamariscina, *Hedw. Sp. Musc. t.* 51 (*non Swartz*).

Hab. Common throughout the Islands, *Cunningham, etc.*

A native of Lord Auckland's Group.—*Surculus* nearly 2 inches high. *Frond* roundish, horizontal, 1 inch or more in diameter. *Leaves* yellowish-green, rather glossy, not much altered by drying, sharply serrulate. *Seta* very thick, ⅓ inch long, purplish, suddenly bent, not arcuate at the top; capsule pendulous, closely applied to the seta, ovate, pale brown, very abrupt and tuberculate at the base. *Operculum* as long as the capsule, pale yellow. *Annulus* distinct. *Calyptra* conico-mitriform, not dimidiate, coriaceous, as long as the operculum, yellowish.

An authentic specimen of *Leskea tamariscina,* Swartz, in the Hookerian Herbarium, from Dr. Swartz, is identical with *Hypnum laricinum,* Hook. Musc. Exot.; and Hedwig greatly erred in uniting this to it. *H. setigerum* is

abundantly different in the conspicuous setulæ intermixed with the leaves, and in the dioicous inflorescence. It is also very different in aspect, and altogether a more elegant Moss. It seems to be rare, and is seldom found with fruit.

Gen. LIX. LOPIDIUM, *Hook. fil. et Wils.*

Peristomium duplex, *Leskeæ: internum* ciliis nullis. *Calyptra* conico-subulata. *Capsula* æqualis, inclinata vel cernua, annulata, breviter pedicellata. *Operculum* rostratum.—Caulis *repens.* Surculi *subdendroidei, pinnatim ramosi;* fronde *elongata erecta;* ramis *haud radiatis.* Folia *tristicha, oblonga, lateralia obliqua.* (Name from λοπις, *a scale.*)

1. Lopidium *concinnum*, Hook.; dioicum, surculo bipinnato inferne nudo erecto, foliis bifariis verticalibus stipulisque oblongis brevi-acuminatis marginatis apice serratis nervo subcontinuo, seta brevi crassa, capsula inclinata, operculo conico-subulato, peristomii dentibus remote articulatis asperis.—Leskea concinna, *Hook. Musc. Exot. t.* 34 (*non Schwægr. Suppl. t.* 269). Hypopterygium concinnum, *Bridel, Bryol. Univ. v.* 2. *p.* 711 (*ex parte*).

HAB. Middle Island: Dusky Bay, *Menzies.*

Lord Auckland's Islands are the only other known habitat.—*Surculus* 3 inches long. *Frond* erect, ovate-oblong. *Leaves* yellowish-green or pale fulvous, crowded, ovate-lingulate, of firmer texture and more ligulate than in the next species. *Stipules* or accessory leaves somewhat smaller, but not remarkably so, and more dilated at the base; areolæ very small, roundish. *Seta* scarcely 2 lines in length, thick, more so upwards, very little longer than the perichætial leaves, which are nerved nearly to the summit, much attenuated, and nearly entire (not well represented in Musc. Exot.). *Capsule* suberect. *Operculum* nearly as long. *Peristome* yellow, outer teeth smaller than in the next species, distantly barred. *Inner peristome* more deeply divided into narrow wavy processes. *Hypopterygium Struthiopteris*, Bridel (according to a Java specimen from Prof. Nees), differs in the more tapering leaves and ovate-lanceolate, tapering stipules.

2. Lopidium *pallens*, Hook. fil. et Wils.; monoicum, surculo erecto bipinnatim ramoso inferne nudo, foliis bifariis verticalibus ovato-oblongis acuminulatis marginatis apice denticulatis siccitate crispulis subtortilibus, tegminibus cordato-acuminatis perichætialibus brevioribus, seta longiuscula gracili scaberula, capsula horizontali annulata, operculo rostrato, peristomii dentibus crebre trabeculatis.—Leskea concinna, *Schwægr. Suppl. t.* 269 (*non Hook.*).

HAB. Northern and Middle Islands: Auckland and Waikehi, *Sinclair.* Bay of Islands, *J. D. H.* Bligh's Sound, Hutt Valley, Milford Sound, Wellington and Ship Cove, *Lyall.*

A native of Tasmania, South America, and Chiloe, of the same size as the preceding, with paler foliage. Easily distinguished by the slender, more elongated, roughish seta, and essentially so by the inflorescence.—*Operculum* as long as the capsule. *Inner peristome* less deeply divided, the processes longer, carinate; outer teeth larger, more closely barred. *Calyptra* pale, sometimes entire, usually cloven on one side.

Gen. LX. CATHAROMNION, *Hook. fil. et Wils.*

Peristomium simplex, internum: *dentes* 16, lineari-lanceolati, carinati, membrana basilari brevi connexi. *Calyptra* conico-mitræformis, basi lacera. *Capsula* suberecta, oblonga. *Operculum* conico-subulatum.—Caulis *repens.* Surculi *dendroidei, superne pinnatim ramosi.* Folia *tristicha, subrotunda, ciliata.* Florescentia *dioica.* (Name from καθαρος, *neat.*)

1. Catharomnion *ciliatum*, Hedw.; dioicum, surculo pinnatim ramoso inferne nudo, foliis ovato-subrotundis bifariis longe ciliatis evanidinerviis, tegminibus multo minoribus ovato-lanceolatis acuminatis ciliatis, setulis intrafoliaceis aciculiformibus, seta breviuscula crassa, capsula oblonga suberecta, operculo

rostrato.—Pterigynandrum ciliatum, *Hedw. Sp. Musc. t.* 17. Hypopterygium ciliatum, *Bridel, Bryol. Univ. v.* 2. *p.* 710.

Hab. Northern and Middle Islands: Bay of Islands, *J. D. H.* Auckland, *Knight, Sinclair, Colenso.* Wangaroa, *Col. Bolton.*

Surculi 1 inch long, covered below with brown radicles. *Leaves* pale green, hoary with the long, numerous ciliary processes that fringe the margin, intermixed with spinular bristles, as in *Hypopterygium setigerum. Seta* scarcely ¼ inch long, thick, purplish. *Capsule* somewhat unequal, nearly erect, reddish-brown. *Calyptra* inflexed at the base, brownish. *Peristome* large, nearly half as long as the capsule, yellowish-brown. *Male plants* more slender, sparingly branched, with numerous axillary gemmiform reddish flowers.

Gen. LXI. CYATHOPHORUM, *P. Beauv.*

Peristomium duplex, *Hypni. Calyptra* mitræformis, parva. *Capsula* æqualis, annulata, brevissime pedunculata, pedunculo vaginula tumida cyathiformi inserto. *Operculum* convexo-acuminatum. *Florescentia* dioica: antheridia paraphysibus clavatis suffulta.—Caulis *repens.* Surculi *erecti, subsimplices, filicoidei.* Folia *tristicha: lateralia verticalia, patentia, obliqua; dorsalia seu tegmina minora, subrotunda, cauli appressa.* (Name from κυαθος, *a cup,* φορεω, *I bear;* in allusion to the vaginula.)

1. Cyathophorum *pennatum,* Lab.; dioicum, surculis erectis complanatis, foliis distichis pterygoideis ovato-oblongis obliquis serratis nervo brevi, tegminibus subrotundis apiculatis, seta brevissima curvula, capsula ovali, operculo conico-acuminato.—Hookeria pennata, *Hook. Musc. Exot. t.* 163. Cyathophorum pennatum, *Bridel, Bryol. Univ. v.* 2. *p.* 722.

Var. β. *minus;* foliis distantibus acutis.

Var. γ. *apiculatum;* surculo brevi, foliis ovato-subrotundis acuminulatis argutius spinuloso-serratis.

Hab. Very common throughout the Islands, *Menzies, etc.* Var. β. Otara Forest, *Colenso.* Var. γ. Middle Island, *Lyall.*

A native of Tasmania, and Lord Auckland's Islands.—*Surculi* from 2 inches to a foot long or more, naked below. *Lateral leaves* large, 2–3 lines long, dark green; nerve ceasing below the middle, or often very short and forked. *Fructification* produced in the upper part of the frond in the axils of the lateral leaves. *Capsule* large, pale brown, on a thick curved pedicel not exceeding its own length. *Operculum* half as long as the capsule. *Calyptra* very small, covering the upper portion of the operculum, cellular, brown. *Inner peristome* with cilia two or three together. *Spores* small. *Perichætial* leaves, small, attenuated. *Vaginula* large, conspicuous.—Var. β has the surculus with fruit not 2 inches long. This may prove to be a different species, when better specimens are obtained.

Tribe XXII. Racopilaceæ.

Gen. LXII. RACOPILUM, *P. Beauv.*

Peristomium duplex, *Hypni. Calyptra* conico-mitræformis, basi inflexa pilosa, interdum dimidiata, fere glabra. *Capsula* inæqualis, curvata, cernua, sulcata, pachyderma, annulata. *Operculum* rostratum.—Caulis *repens, vage subpinnatim ramosus.* Folia *plerumque dimorpha: lateralia subdisticha, patula; intermedia minora, diversiformia; omnia excurrentinervia, pilifera, minute opaceque areolata, subrotunda, subpapillosa.*

In this singular group the leaves are arranged in a manner quite different from *Hypopterygiaceæ,* with which Bridel has united it. The disposition of the leaves is ⅜, or perhaps occasionally ⅖, the small intermediate leaves being only on the upper side of the rachis.

1. Racopilum *australe,* Hook. fil. et Wils.; dioicum, caule repente radiculoso tomentoso vage subpinnatim ramoso, foliis lateralibus distiche patulis siccitate crispato-tortuosis oblongo-ovatis apice serrulatis nervo pellucido excurrente longe cuspidatis intermediis paullo minoribus ovato-acuminatis surrectis, seta crassa breviuscula, capsula oblonga cernua arcuata sulcata basi strumulosa, operculo brevirostri, calyptra pilosa basi campanulata. (Tab. XCII. Fig. 7.)

Hab. Northern and Middle Islands, in various localities; common at the roots of trees.

A Tasmanian Moss.—*Leaves* in the principal specimens yellowish, in others deep green, much crisped and undulated when dry. *Seta* very thick, triangular when dry, about ½ inch long. *Capsule* at first pale yellowish-olive, when older deep red, with an operculum half its own length. *Calyptra* pale yellow, very hairy, inflated below, not dimidiate. *Teeth* red, large. *Inner peristome* with cilia.—In Colenso's specimen the male flowers are nidulant on the fertile plant; but specimens from Dr. Sinclair are truly dioicous.—Plate XCII. Fig. 7:—1, plant, *natural size;* 2, young capsule and calyptra; 3, mature capsule and operculum; 4, 5, leaves:—*all magnified.*

2. Racopilum *cristatum,* Hook. fil. et Wils.; monoicum?, caule repente, foliis lateralibus distiche patulis siccitate conniventibus ovali-oblongis obtusiusculis apice serrulatis nervo concolore excurrente cuspidatis intermediis cordato-acuminatis duplo minoribus, seta longiore gracili, capsula arcuata sulcata, operculo brevirostri, calyptra subulata dimidiata parce pilosa, peristomii dentibus dorso scabris.—R. gymnanthe, *Wils. MSS.* (Tab. XCII. Fig. 5.)

Hab. Northern Island: Tehawera forests, *Colenso.*

A native of Norfolk Island, Australia, Juan Fernandez? Guadeloupe? East Indies? Mauritius?—*Leaves* more obtuse than in the preceding, not tortuous when dry, the cuspidate points shorter, areolæ larger. *Seta* about ¾ inch long, not angular. *Male flowers* nidulant.—Probably *Hypnum mucronatum,* P. Beauv., from Africa, is a robust form of this, but the original specimen in Herb. Hook. is barren. The specimens from Juan Fernandez and Guadeloupe have the capsule more elongated (*R. leptocarpum,* Wils. MSS.).—Plate XCII. Fig. 5:—1, plant, *natural size;* 2, capsule; 3, operculum; 4, calyptra; 5, portion of branch and leaves:—*all magnified.*

3. Racopilum *robustum,* Hook. fil. et Wils.; monoicum?, caule repente, foliis uniformibus confertis patentibus siccitate lateribus complicato-involutis cordato-ovatis acuminatis excurrentinerviis apice subserratis, seta crassa longiuscula, capsula arcuato-cernua sulcata, calyptra pilosa mitræformi. (Tab. XCII. Fig. 6.)

Hab. Northern Island: forests of Tehautotara, *Colenso.*

A larger species than either of the preceding. *Leaves* yellowish or pale green, more crowded, tapering gradually to an acute point; nerve much excurrent. *Seta* longer than in *R. australe. Calyptra* less hairy.—*R. spectabile,* R. et Hornsch., differs from this in the strongly serrated unequal leaves and dimidiate subulate calyptra. *R. tomentosum,* Swartz, differs from this and all the preceding in the truly monoicous inflorescence and naked dimidiate calyptra.—Plate XCII. Fig. 6:—1, plant, *natural size;* 2, capsule; 3, calyptra; 4, 5, leaves:—*all magnified.*

Tribe XXIII. Hookeriaceæ.

Gen. LXIII. HOOKERIA, *Smith.*

Peristomium duplex: *exterius,* dentes 16, lanceolato-subulati, acuminati, incurvi, intus trabeculati, dorso costis prominentibus plus minus distantibus biliratis: *interius,* membrana plicata, in processus 16 carinatos raro ciliis interpositis fissa. *Calyptra* mitræformis. *Capsula* cernua, ovata, longius pedunculata. —Caulis *repens vel prostratus, vage ramosus.* Rami *plerumque compressi.* Folia *ordine* $\frac{2}{5}$ *vel* $\frac{3}{8}$ *disposita, sæpius distiche imbricata vel complanata, lateralia obliquata, areolis majusculis, rhomboideis vel hexagonis.*

The genus *Hookeria,* as limited in 'Bryologia Europæa,' not only excludes all the New Zealand species, but also

H. lucens, the type of the Smithian genus. In this work it is thought best to retain the genus as above defined, merely noting the modern genera as sections.

§ 1. SAULOMA, Hook. fil. et Wils.—*Calyptra nuda, basi inflexa, integerrima, demum lacera, haud fimbriata. Peristomii externi dentes dorso remotius lirati, interni processus carinati, ciliis nullis. Folia imbricata, subsecunda (haud compressa), immarginata, laxe rhomboideo-areolata.*—(Name from σαυλος, *soft.*)

This group differs from *Actinodontium*, Schwægr. (Suppl. pt. 2. v. 2. p. 75. t. 174), and from some (probably all) of the species of *Lepidopilum*, Bridel, in the structure of the teeth; in those, the outer lamina is flat and broad, the inner one narrow and prominent, presenting, in section, a semicylindrical central rib.

1. Hookeria *tenella,* Hook. fil. et Wils.; dioica, caule humili vage ramoso, foliis confertis imbricatis secundis oblongo-ovatis acutiusculis margine reflexis enerviis laxe reticulatis pellucidis siccitate plicato-striatis, capsula subcernua ovata parva, operculo rostellato, calyptra nuda mitræformi. (TAB. XCII. Fig. 8.)

HAB. Northern and Middle Islands: Banks' Peninsula, *Lyall.*

A Tasmanian Moss.—*Stem* and *branches* $\frac{1}{3}$ inch long. *Leaves* very pale green, almost white (fulvous in the Tasmanian specimens) glossy, more or less plicate, narrowly ovate. *Perichætial leaves* small, ovate-lanceolate, erect. *Seta* $\frac{1}{2}$ inch long, reddish. *Capsule* yellowish-brown, cernuous, often erect, when dry contracted below the mouth. *Teeth* yellow, or at times reddish, the dorsal ridges distant, semicylindrical.—PLATE XCII. Fig. 8:—1, plant, *natural size;* 2, moist, and 3, dry capsules; 4, operculum; 5, calyptra; 6, 7, leaves:—*all magnified.*

§ 2. MNIADELPHUS, C. Müller.—*Calyptra conico-mitræformis, basi fimbriata* (*ut in* Daltonia). *Peristomii interni cilia nulla. Folia plerumque marginata, uninervia, nervo evanido.*

* *Foliis marginatis.*

2. Hookeria *apiculata,* Hook. fil. et Wils.; dioica, foliis subrotundo-spathulatis apiculatis marginatis enerviis, seta scabriuscula, capsula cernua, calyptra pilosa basi fimbriata.—*Fl. Antarct. pt.* 2. *t.* 155. *f.* 6.

Var. β; foliis hyalinis serrato-dentatis siccitate crispulis, areolis majoribus.

HAB. Northern Island, *Colenso;* a single stem only, barren, amongst *Racopilum.*

Also found in Tasmania, and Hermite Island near Cape Horn.

3. Hookeria *rotundifolia,* Hook. fil. et Wils.; dioica, ramis subcompressis gracilibus rubellis, foliis laxe patentibus siccitate crispulis ovato-rotundatis apiculatis marginatis denticulatis seminerviis (areolis majusculis hexagonis), seta gracili, capsula horizontali, operculo longius rostrato, calyptra basi fimbriata apice subpilosa.—*Hook. fil. et Wils. in Lond. Journ. Bot.* 1844, *p.* 551. (TAB. XCIII. Fig. 1.)

HAB. Northern and Middle Islands, *Colenso:* Bay of Islands, on stumps of trees, *J. D. H.* Port Nicholson and Milford Sound, *Lyall.* Auckland, *Knight.*

Smaller than *H. Dicksoni*, Hook., to which it is closely allied, but from which it differs in the roundish denticulate leaves, more shortly apiculate. *Seta* $\frac{1}{4}$ inch long. *Perichætial leaves* margined, toothed. *Teeth* of peristome yellow, with two rather distant subcylindrical dorsal ridges, forming the external lamina of the tooth. *Inner peristome* without cilia; processes carinate, perforated.—PLATE XCIII. Fig. 1:—1, plant, *natural size;* 2, capsule; 3, portion of stem and leaves; 4, leaf:—*all magnified.*

4. Hookeria *crispula,* Hook. fil. et Wils.; dioica, ramis subcompressis, foliis laxe disticheque patentibus siccitate crispato-undulatis obovatis apiculatis marginatis integerrimis seminerviis opacis (areolis minimis subrotundis) inferne pellucide laxius areolatis, perichætialibus ovato-acuminatis, seta gracili, capsula operculo calyptraque ut in *H. rotundifolia.*—*Hook. fil. et Wils. loc. cit.* (TAB. XCIII. Fig. 2.)

HAB. Northern Island: Bay of Islands, on clay banks, *J. D. H.*

Also found in Lord Auckland's Islands (*fid.* Montagne).—In size not exceeding the preceding. *Stem* green,

never red. *Leaves* full green, not glossy, twice as large as in the last. *Perichætial leaves* entire. *Seta* $\frac{1}{3}$ inch long. *Teeth* pale yellow, with two distant dorsal ridges. *Cilia* none; processes of inner peristome narrow, not perforated.—*Mniadelphus auratus*, C. Müller, from Trinidad, is allied, but has leaves glossy, with a longer apiculus and larger areolæ.—PLATE XCIII. Fig. 2:—1, plant, *natural size;* 2, portion of stem and capsule, etc.; 3, capsule; 4, leaf:—*all magnified.*

5. Hookeria *pulchella,* Hook. fil. et Wils.; dioica, ramis subflaccidis compressiusculis, foliis confertis distiche imbricatis siccitate margine undulatis obovatis obtusis mucronulatis marginatis integerrimis seminerviis perichætialibus obtusis, capsula inclinata apophysata, operculo rostrato, calyptra fimbriata apice glabra.—*Fl. Antarct. pt.* 1. *t.* 62. *f.* 1.

Var. *β;* ramis crassioribus, capsula cernua.

HAB. Northern Island: Tararua, *Colenso.* Var. *β.* Middle Island: Bligh's Sound, *Lyall.*

A Lord Auckland Island plant.—Larger than the preceding. *Leaves* yellowish, more crowded, flaccid, more obtuse, with a very short obscure mucro; areolæ larger. *Perichætial leaves* blunt, reflexed at the apex. *Seta* nearly $\frac{1}{2}$ inch long. *Male flower* on a short pedicel, roundish.—*H. mniifolia,* Hornsch., from South Africa (Linnæa, xv. 141), seems to be nearly allied, but, according to Dr. Montagne, is different. *H. seminervis,* Mont. (Cent. v. 5. p. 11), from Java, has leaves more oblong and spathulate, with larger areolæ and a longer nerve. *H. pulchella,* Griffith, from the East Indies, agrees in the monoicous inflorescence, but has leaves as in *H. crispula,* with the small capsule of *H. adnata.*

6. Hookeria *amblyophylla,* Hook. fil. et Wils.; dioica, ramis tumidiusculis compressis, foliis confertis distiche imbricatis erecto-patentibus siccitate appressis obovatis obtusissimis marginatis integerrimis evanidinerviis, perichætialibus obtusis, calyptra fimbriata. (TAB. XCIII. Fig. 3.)

HAB. Northern Island: Port Nicholson, *Sinclair;* a scrap only, with *Dicranum Billardieri.* Auckland, *Knight.*

A Tasmanian Moss, like the last in size and general aspect.—*Leaves* yellowish-green, lurid when old, rounded and blunt at the apex without any mucro, the margin all round the apex curiously reflexed like the brim of a hat in this specimen, but some of the Tasmanian specimens do not show this character. *Male flowers* oblong-urceolate, the perigonial scales blunt and recurved at the apex.—PLATE XCIII. Fig. 3:—1, plant, *natural size;* 2, portion of stem, leaves, seta, and calyptra; 3, leaf:—*all magnified.*

7. Hookeria *adnata,* Hook. fil. et Wils.; monoica, ramis compressis, foliis distiche imbricatis siccitate margine undulatis elliptico-oblongis subspathulatis acuminulatis membranaceis integerrimis tenuissime marginatis evanidinerviis, seta gracillima, capsula minuta ovata cernua, operculo rostrato, calyptra fimbriata subpilosa. (TAB. XCIII. Fig. 4.)

HAB. Northern Island: Bay of Islands, on leaves of trees, and especially on fronds of *Trichomanes elongatum, J. D. H., Cunningham, Colenso, Sinclair.*

A delicate and beautiful species, of a pale yellow colour.—*Stem* reddish. *Leaves* larger and more filmy than in any of the preceding, the margin extremely narrow. *Seta* $\frac{1}{3}$ inch long, very slender, red. *Perichætial leaves* ovate, acuminulate. *Capsule* very small. *Operculum* of the same length as the capsule. *Teeth* with the dorsal ridges in contact as in *Hypnum,* leaving only a sutural line ("linea media" of Bridel, etc.). *Inner peristome* without cilia.——PLATE XCIII. Fig. 4:—1, plant, *natural size;* 2, portion of stem, leaves, seta, capsule, and calyptra; 3, capsule; 4, leaf:—*all magnified.*

** *Foliis immarginatis.*

8. Hookeria *microcarpa,* Hedw.; dioica, caule vage ramoso, ramis complanatis, foliis distiche imbricatis obovatis obtusis integerrimis immarginatis evanidinerviis medio laxe pellucido-areolatis perichætialibus

minutis ovato-lanceolatis, seta breviuscula, capsula parva cernua vel erecta ovata, operculo rostellato, calyptra basi fimbriata.—Hypnum microcarpon, *Hedwig, Sp. Musc. t.* 59. Pterygophyllum microcarpon, *Bridel, Bryol. Univ. v.* 2. *p.* 342.

HAB. Throughout the Islands, *Cunningham, Logan, Lyall, etc.*

A Tasmanian Moss.—*Stem* 1–3 inches long. *Leaves* larger than in any of the preceding, pale green, whitish in the middle, appressed and complanate when dry, sometimes bending backwards; areolæ of the central portion near the nerve large and pellucid, thence gradually diminishing in size as they approach the margin, where they are extremely small. *Seta* about ½ inch long, the vaginula visible from the small size of the perichætial leaves. *Capsule* small, purplish, cernuous in some of the specimens, in others erect, as figured by Hedwig, like that of *Daltonia*, with which it agrees in the fringed calyptra (the fringe not always present in the specimens). The *cellules* forming the wall of the capsule are curiously marked with radiating striæ. *Teeth of the peristome* with distant dorsal ridges. *Operculum* rather short.

§ 3. PTERYGOPHYLLUM, Bridel.—*Calyptra basi haud fimbriata, plus minus laciniata. Peristomii externi dentes remote lirati. Folia complanata, immarginata, laxe areolata, obtusa, nervo subbifurco, medio evanido.*

9. Hookeria *quadrifaria*, Smith; dioica, caule erecto subramoso, ramis complanatis, foliis distiche imbricatis lateralibus verticalibus rhomboideo-obovatis obliquatis obtusis intermediis erecto-appressis subrotundis omnibus crebre ac minutissime denticulatis evanidinerviis, capsula oblonga pendula, calyptra brevi pilosiuscula.—*Hook. Musc. Exot. t.* 109. *Schwægr. Suppl. t.* 162. Pterygophyllum, *Bridel.*

HAB. Throughout the Islands; in dark damp woods, not uncommon.

The largest species of the group.—*Barren stems* 2 to 10 inches long, and with the foliage ⅓ inch broad. Fertile specimens 1 inch long. *Leaves* large, pale green, little altered by drying, whitish when old, rounded and obtuse at the apex; texture thick, composed of large, coarse, hexagonal cells; margin of leaf minutely denticulate in the original fertile specimen of Menzies and in ours, but the two barren specimens of Menzies from Dusky Bay have the margin entire. *Nerve* thick at the base, forked above. *Perichætial leaves* small, ovate. *Seta* 1 inch long. *Teeth* of peristome beautifully variegated, having two prominent, cylindrical, red, dorsal ridges, widely separated, and the internal part of the tooth being yellow. *Calyptra* subconical, small, with a few scattered hairs.—The disposition of the leaves is certainly not quadrifarious, but ⅜, or two rows of intermediate leaves on the upper side, two at the back, and two rows of vertical-lateral leaves on each side.

10. Hookeria *robusta*, Hook. fil. et Wils.; dioica, caule rigido elongato subramoso, foliis distiche imbricatis lateralibus patentibus verticalibus ovato-oblongis obtusis dentatis evanidinerviis intermediis erectis appressis obovatis siccitate undulatis, capsula ovata pendula, calyptra glabra. (TAB. XCIII. Fig. 5.)

HAB. Northern Island, *Colenso.*

Nearly as large as the preceding, which it so much resembles as to be easily mistaken for it.—*Stems* 1 to 4 inches long. *Leaves* narrower, less crowded, of thicker substance, pale yellowish-green, inclining to glaucous, slightly undulated when dry; nerve purplish. *Seta* ¾ inch long. *Teeth* smaller than in the last, the dorsal ridges more approximate. *Calyptra* subconical.—This and the next species may perhaps be states of *H. dentata*, Hook. fil. et Wils. (in Fl. Antarct. pt. 1. t. 62. f. 2); but after careful comparison, it seems advisable to separate them as species. —PLATE XCIII. Fig. 5:—1, plants, *natural size;* 2, leaf, *magnified.*

11. Hookeria *nigella*, Hook. fil. et Wils.; dioica, caule humili erecto-incurvo rigidulo subramoso, foliis remotiusculis complanatis lateralibus spathulatis basi angustatis dentatis seminerviis intermediis obovatis dentatis perichætialibus rotundo-ovatis concavis, capsula subrotundo-ovata pendula, calyptra nuda. (TAB. XCIII. Fig. 6.)

HAB. Throughout the Islands: common in woods.

A Tasmanian Moss.—*Stems* about ½ inch in height (¼ inch in some of Colenso's specimens), slender, somewhat rigid. *Leaves* lurid-green, shrinking slightly when dry, and then widely separated. *Seta* 1 inch long in the larger specimens (¼ inch in Colenso's specimens). *Perichætial leaves* forming a bulb, conspicuous. *Capsule* subpyriform, with a rostrate operculum nearly as long. *Teeth* with two rather distant, red, dorsal ridges, as in the last. *Calyptra* subconical, shorter than in *H. robusta.*—*H. obscura*, Mont. (Cent. 5, 11 *bis*), from Chili, supposed to be a small state of *dentata*, is different, if monoicous, as reported.—Plate XCIII. Fig. 6:—1, plant, *natural size;* 2, portion of plant; 3, capsule; 4, 5, leaves:—*all magnified.*

§ 4. Eriopus, Bridel.—*Calyptra basi fimbriata, superne papillosa. Seta filamentoso-hirta. Peristomium externum dentibus lamellato-trabeculatis incurvis; internum ciliolis instructum. Folia submarginata, serrata, basi binervia, laxe areolata.*

12. Hookeria *cristata*, Hedw.; dioica, caule suberecto rigido-subramoso, foliis distiche imbricatis subheteromallis late obovatis acutiusculis submarginatis dentato-serratis basi binerviis siccitate crispato-undulatis intermediis subrotundis apiculatis perichætialibus late ovatis piliformi-acuminatis, seta breviuscula hispida superne pilis albidis longis cristata, capsula pyriformi subpendula, operculo rostrato, calyptra fimbriata apice papillis subulatis scabra.—Leskea cristata, *Hedw. Sp. Musc. t.* 49. Chætophora (Eriopus) cristatus, *Bridel, Bryol. Univ. v.* 2. *p.* 339.

Var. *β;* foliis brevioribus subrotundis siccitate vix crispulis pallide fulvellis.

Hab. Common throughout the Islands; in dense forests, on trunks of trees, etc. in very damp spots. Var. *β*. Waikare, *Colenso.*

Stems 2 to 4 inches long, robust and rigid. *Leaves* green, often pale, not crowded, shrinking, crisped and undulated when dry, arrangement ⅜; margin with a few rows of narrower cellules, forming an obscure border. *Seta* ⅓ to ¾ inch long, pale, covered with white hairs forming a distinct crest at the top as large as the capsule. *Calyptra* white, curiously covered and fringed with elongated papillæ, short, mitriform. *Teeth* orange, with large, prominent, contiguous, dorsal ridges, internally trabeculate with lamellar processes, much incurved. *Inner peristome* with solitary cilia. *Vaginula* oblong, narrower than the seta above. An annulus is present.

Nat. Ord. CI. HEPATICÆ, *L.*

By William Mitten, Esq.

Of the New Zealand *Hepaticæ*, about one-third are peculiar to the Islands included under that name, thirteen only are found in Britain, most of which are cosmopolite, and the remainder are common to Tasmania, Fuegia, or various other Antarctic lands. A few are found at the Cape of Good Hope, and the whole number already known (about 190) exceeds that found in Britain by about forty species; and there can be no doubt that many others will yet reward the diligent investigator, particularly in the less explored districts. Of eighty species enumerated in the 'Flora Antarctica' as natives of Lord Auckland's Group and Campbell's Island, about thirty-five have not hitherto been found in New Zealand, but no doubt exist, especially on the mountains of the Middle and Southern Islands; some few of these are also Fuegian species.

It is extremely to be regretted that several New Zealand species brought home by the Antarctic Expedition, and described by Drs. Taylor and Hooker, do not now exist in the Hookerian or any other European Herbarium. These were accidentally omitted to be returned, after examination, by that indefatigable author, and probably now exist in his herbarium only, which, after his death, was purchased by the patriotic founder of the Lowell Institute (U. S. Am.). The great ardour and precipitancy with which Dr. Taylor

pursued his studies in *Hepaticæ*, has further led in several instances to misnomers in the collections which have passed under his eyes and hands; specimens carefully examined having been returned bearing other names than those under which they were published by him. These circumstances, together with the great difficulty attending the study of the variable, often minute, and very generally barren species of this Natural Order, must be borne in mind by those who follow the steps of the pioneers in this most incomplete department of Antarctic Botany.

The arrangement followed here is very nearly that of the 'Synopsis Hepaticarum,' of Gottsche, Lindenberg, and Nees von Esenbeck, in which full descriptions of many of the genera and species here mentioned by name only, will be found; but for the convenience of those to whom these plants have been hitherto known as *Jungermanniæ*, a short plan of the arrangement, with the most prominent characters which distinguish each genus, is added.—*J. D. H. & W. M.*

SYNOPSIS OF THE GENERA OF NEW ZEALAND HEPATICÆ.

I. Foliosæ.—Plants with leaves and stipules.

A. Leaves succubous.

* Perianth of the same substance as the leaves.

† Perianth terminal.

Jungermannia; perianth tubular; mouth contracted.

Plagiochila; perianth obconic, compressed, two-lipped; plants rarely stipulate.

Leioscyphus; perianth obconic, compressed, two-lipped; stipulate.

Lophocolea; perianth prismatic.

†† Perianth lateral.

Chiloscyphus; perianth campanulate.

Psiloclada; perianth tubular.

** Perianth partly formed out of the stem.

Gymnanthe; perianth terminal.

Saccogyna; perianth lateral.

B. Leaves incubous.

* Perianth and calyptra free.

† Perianth lateral.

Lepidozia; leaves and stipules quadripartite or dentate.

Mastigobryum; leaves entire or tridentate.

Micropterygium; leaves boat-shaped.

†† Perianth terminal.

Isotachis; perianth like that of *Jungermannia;* leaves and stipules nearly equal.

** Calyptra overlaid by, and connate with, the uppermost leaves.

Gottschea; leaves complicate, lamellate.

Polyotus; leaves rounded, with auricles at their ventral bases.

Sendtnera; leaves and stipules deeply divided.

Trichocolea; leaves and stipules divided into filiform laciniæ.

*** Perianth on the upper branches; leaves rounded, with an appressed lower lobe.

† Inferior lobe plane, appressed to the leaf.

Radula; perianth deplanate; stipules none; plants yellowish-green.

Madotheca; perianth contracted at the mouth; plants large, deep green, stipulate.

Lejeunia; perianth various; mouth contracted; stipules rounded, entire, dentate, or bifid; plants often pale.

†† Inferior lobe auriculiform.

Frullania; perianth like that of *Lejeunia;* plants of a rich deep-brown colour.

II. Frondosæ.—Plants frondose.

* Perianth perfect.

Fossombronia; perianth dorsal; leaves distinct, angular.

Noteroclada; perianth subterminal; leaves distinct, rounded.

Petalophyllum; perianth arising from the nerve; frond continuous, crispate.

Zoopsis; perianth lateral; frond ciliate or irregular, with prominent cells.

Podomitrium; perianth ventral; frond leaf-like.

Steetzia; perianth dorsal; frond leafy, procumbent.

** Perianth none.

Symphyogyna; calyptra dorsal; frond often stipitate.

Metzgeria; calyptra ventral; frond continuous.

Sarcomitrium; calyptra lateral; frond carnose.

III. Marchantiæ.—Perianths several, on a common receptacle.

Plagiochasma; perianths opening laterally.

Marchantia; perianths opening downwards.

Dumortiera; perianth none.

Fimbriaria; perianth split into numerous pale bands, cohering at their apices.

IV. Anthocerotæ.—Capsules linear, two-valved.

Anthoceros.

V. Ricciæ.—Capsule imbedded in the substance of the fronds.

Riccia.

Gen. I. JUNGERMANNIA, *Linn.*

1. Jungermannia *squarrosa,* Hook.; caule elongato subsimplici vel parce dichotome ramoso stipulaceo, foliis patenti-squarrosis densissime imbricatis subquadratis undulatis bilobis lobis cuspidatis integerrimis vel unidentatis apicibus deflexis, amphigastriis magnis quadratis bilobis lobis ovatis cuspidato-subulatis margine dentibus subulato-flexuosis binis vel ternis ornatis, perianthio ovato plicato ore lacero-ciliato.—*Hook. Musc. Exot. t.* 78. *G. L. et N.* Syn. Hep. p.* 130.

Hab. Northern Island: small island off Auckland, *Mr. Rich.* Snow-rills on summit of Oparapara, and beech-forests in Ruahine mountains, *Colenso.* Middle Island: Dusky Bay, *Menzies.*

As has been observed (Syn. Hep.) the leaves are not correctly represented in the 'Musci Exotici,' the three or four rather strongly-marked undulations in the recurved part of the leaf having been overlooked. This is the only known New Zealand representative of the rather large group of *Jungermannia,* including *J. barbata,* Schreb., and *J. ventricosa,* Dicks. Of *Gymnomitriæ* no representative has yet been brought from New Zealand, although five inhabit Lord Auckland's and the Falkland Islands, and the British *G. concinnatum* occurs at Cape Horn, differing in no respect from European specimens. *J. minuta,* Fl. Antarct., is identical with *J. ochrophylla,* l. c., and very different from *J. minuta,* Crantz, which has not been found in the Southern Hemisphere.

In *J. atrocapilla,* Hook. fil. et Tayl., from Kerguelen's Land, the form of the leaf gradually passes from ovate bidentate in the cauline, to orbicular, without any trace of the emargination in those of the involucrum; but perfect involucra have not been seen. In *J. Montagnei,* Mitten (*Sarcoscyphus laxifolius,* Mont., G. L. et N. Syn. Hep. p. 618), a perianth is almost completely formed by the union, almost to their apices, of the upper pair of leaves, which are

* Throughout this Natural Order, the valuable 'Synopsis Hepaticarum' of Gottsche, Lindenberg, and Nees von Esenbeck, is thus quoted.

subtended by another pair, also combined to about their middle, hence forming an almost perfect perianth, as in *Jungermannia*. The transition from *Gymnomitrium concinnatum*, through *Sarcoscyphus*, to the *Jungermanniæ* with perfect perianths, is so gradual, that the former should rather be considered as a less perfectly developed species of *Jungermannia*; it is hence probable that all the species referred to *Gymnomitrium* in the 'Synopsis Hepaticarum' must be excluded, excepting *G. concinnatum* and *G. coralloides*; the rest belong to *Gymnanthe* and *Fossombronia*.

2. Jungermannia *pulchella*, Hook. *Musc. Exot. t.* 94. *G. L. et N. Syn. Hep. p.* 129.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies*. Port Preservation and Port Nicholson; growing amongst *Trichocolea lanata* (Hook.), *Lyall*. Auckland, *Sinclair*.

A highly curious species.—*Leaves* of a very thin texture. *Perianths* trigonous above; mouth truncate, fringed with long, slender teeth, which stand out in all directions.

3. Jungermannia *quadrifida*, Mitten; caule repente adscendente ramoso inferne stolonifero, foliis patentibus ad medium 4-fidis laciniis lanceolatis integerrimis vel in caule fertili subdentatis, amphigastriis conformibus, perianthio elongato superne trigono ore truncato laciniato-dentato, foliis involucralibus amphigastrioque argute dentatis. (TAB. XCIV. Fig. 1.)

HAB. Northern Island: Patea village; creeping on the earth with *Marchantia macropora* (Mitten), *Colenso*.

Vagans, sordide fusca, apicibus lutescentibus roseo-tinctis. *Caulis* 4–8-linearis, inferne parce radiculosus. *Folia* verticalia, sinubus obtusiusculis.

Allied to *J. trichophylla*, and intermediate between that and *J. pulchella*, which it resembles in its quadripartite leaves and stipules, trigonal, truncate perianth, and in the not inflexed laciniæ which surround its mouth. *J. quadripartita*, Hook. (Musc. Exot. t. 117), appears to be nearly allied to this, but sufficiently distinct.—PLATE XCIV. Fig. 1:—1, specimens, *natural size*; 2, cauline leaf; 3, involucral leaf; 4, perianth and involucral leaves:—*all but fig.* 1 *magnified*.

4. Jungermannia *dentata*, Raddi.—*G. L. et N. Syn. Hep. p.* 143.

HAB. Northern Island: Bay of Islands, *J. D. H.* Near Te Aute, *Colenso*.

5. Jungermannia *colorata*, Lehm.—*G. L. et N. Syn. Hep. pp.* 86, 673. *Fl. Antarct. pp.* 149, 429.

HAB. Northern Island: summit of Ruahine mountains, and snow-water rills, summit of Oparapara, *Colenso*.

Probably common on the mountains of New Zealand, as it occurs in all the Antarctic regions.

6. Jungermannia *concinnata*, Lightf.—*Hook. Brit. Jung. t.* 3. Gymnomitrium concinnatum, *Corda*, *G. L. et N. Syn. Hep. p.* 3.

HAB. Northern Island: summit of Ruahine mountains, *Colenso*.

Corresponding entirely with British specimens. This species was gathered on the top of Mount Forster, in Hermite Island, Cape Horn, but was overlooked in the enumeration of the species from that locality.

7. Jungermannia *flexicaulis*, Nees, *in Linnea, v.* 6. *p.* 604.—*G. L. et N. Syn. Hep. p.* 87.

HAB. Northern Island; amongst *Plagiochila falcata*, Hook. Tararua mountains, *Colenso*.

A pretty species, with much the habit of *J. colorata*, having its stems straight or elegantly flexuose. The specimens agree entirely with authentic ones from Java, and with others from the Sandwich Islands.

8. Jungermannia *monodon*, Hook. fil. et Tayl.; caule procumbente flexuoso radiculoso e ventre innovante parce ramoso, foliis adscendentibus vel semiverticalibus arcte imbricatis homomallis ovato-lanceolatis, margine ventrali dente breviore lobuliformi terminato [rudimento lobuli folii alterius deficientis], amphigastriis nullis, perianthio oblongo quadriplicato, ore connivente ciliato, foliis involucralibus polymorphis

multifidis dentatis.—*Hook. fil. et Tayl. in Lond. Journ. Bot.* 1844, *p.* 559. *Lehm. Pug. pl.* 8. *p.* 7. *G. L. et N. Syn. Hep. p.* 664. *Raoul, En. Plant. Nov. Zeland. p.* 35. (Tab. XCIV. Fig. 2.)

Hab. Northern and Middle Islands: Bay of Islands, *J. D. H.* Port Nicholson and Wairarape valley, and Tararua mountains, *Colenso.* Port Preservation, *Lyall.*

Cæspitosus, fuscus v. purpureus. *Caulis* 1–2-pollicaris, flexuosus, radiculosus, sub perichætio innovationibus ramosus. *Folia* caulina sicca antice adpressa, humectata semiverticalia, patentia, margine ventrali incurvo; inferiora bidentata sinu parvo obtuso, superiora vel margine ventrali dente parvo obtuso rudimentario vel sæpius (cum margine dorsali) omnino integerrima. *Folia involucralia* exteriora majora bidentata denticulata, interiora minora bifida varieque dentata. *Perianthium* obtusiusculum.

The curious suppression of the ventral lobe in the perfect cauline leaves is peculiar to this species, but may also occur in *J. contracta*, Nees, from Java; for although sufficient specimens of this last have not been seen, to ascertain if the lower leaves are bidentate, yet those of the involucrum resemble the involucral leaves of *J. monodon*, in being cleft into two unequal parts.—Plate XCIV. Fig. 2:—1, specimens, *natural size;* 2, cauline leaves; 3, involucral leaves; 4, summit of stem with perianth:—*all magnified.*

9. Jungermannia *schismoides*, Mont.—*Flor. Antarct. pp.* 150, 434. *t.* clxi. *f.* 9.

Hab. Southern Island: creeping over *Polyotus Magellanicus, Lyall.*

A very curious Lord Auckland Island and Fuegian species, of which three or four stems are all that have yet been seen from New Zealand.—The areolation of the group of *Jungermanniæ* to which this and *J. monodon* belong, differs considerably from that found in other sections; the cells are rounded and remote, so that the leaves appear dotted, nearly as in *Sendtnera.* Amongst the exotic allied species are—*J. tubulosa*, Nees (*J. leucostoma* and *J. leucocephala*, Tayl.), a common South American plant; *J. aurita*, Lehm. [? *Sarcoscyphus auritus*, Nees], from the Cape of Good Hope; *J. Esenbeckii*, Mont.; *J. imbricata*, Wils., and *J. involutifolia*, Mont.; *J. crebrifolia*, Hook. fil. et Tayl., Flor. Antarct. (tab. clvii. fig. 9), in which species a distinct male spike has been once observed; and *J. biapiculata*, Hook. fil. et Tayl., which seems intermediate between *J. incumbens*, L. et Ldbg., and *J. piligera*, Nees, species which present but very slight distinctions.

10. Jungermannia *inundata*, Hook. fil. et Tayl.; caule procumbente radiculoso infra apicem innovante, foliis semiverticalibus orbiculatis imbricatis immarginatis patentibus, involucralibus majoribus patentibus, perianthio breviusculo turbinato superne obtuse 4–5-plicato apiculato.—*Lond. Journ. Bot.* 1844, *p.* 559, *ex parte.* (Tab. XCIV. Fig. 3.)

Hab. Northern Island: Bay of Islands, in places subject to inundation, *J. D. H.* Cape Kidnapper, *Colenso.*

Cæspitosus, sordide viridis. *Caulis* 3–6-linearis. *Folia* subdensa, margine dorsali paullulo decurrente. *Perianthium* immaturum turbinatum, apiculatum, demum 4–5-laciniatum. *Capsula* globosa.

A small dingy species, with all the habit and appearance of *J. nana*, Nees, and *J. sphærocarpa*, Hook., but different from these and all other allied species, in its more turbinate perianths, and more opaque and denser structure. No stipules are present; those described as belonging to it, belong to a small species allied to *J. serrulata*, which is intermixed with the specimens in Herb. Hook.—Plate XCIV. Fig. 3:—1, specimens, *natural size;* 2, a portion of the stem with leaves; 3, a leaf detached; 4, a perianth and involucral leaves:—*all magnified.*

11. Jungermannia *rotata*, Hook. fil. et Tayl.; caule implexo procumbente recurvo ramoso, ramis patenti-recurvis, foliis imbricatis erecto-patentibus secundis rotundatis concaviusculis integerrimis margine anteriore subdecurrente, amphigastriis parvis lanceolatis sæpe obsoletis, perianthio obovato superne obtuse tetragono quadrilaciniato laciniis inflexis, capsula globosa.—*Lond. Journ. Bot.* 1844, *p.* 560. *G. L. et N. Syn. Hep. p.* 672. (Tab. XCIV. Fig. 4.)

Hab. Northern Island: watery places near Taupo, *Colenso.*

Laxe cæspitosus, viridis et nigrescens. *Caulis* 1–3-pollicaris, ramis flexuosis. *Folia* fere verticalia, immarginata; amphigastria cauli adpressa. *Folia involucralia* caulinis similia, erecto-patentia, amphigastrio involucrali nullo.

A species with more the habit and appearance of *J. scalaris*, than of any other yet described; but it is a larger plant, and the leaves are more translucent, and the perianth is perfectly free from the involucral leaves. The perianth of some of the species of this group closely resembles that of *Frullania* and *Lejeunia*, the mouth being contracted into a small short tube, and being, for the most part, about five-plicate above, but this form seems to shade gradually off into that found in the species of other groups. The perianths of *J. scalaris* and *J. compressa*, though so different in appearance, only differ from those of *J. nana* and its allies, in being overlaid and combined with several of the upper pairs of leaves, each pair being also combined for a considerable portion of its length with the back of the pair above it, so that the perianth appears to be sunk into the stem; this structure is not of generic importance, for it is found in *Sendtnera*, *Polyotus*, *Gottschea*, and *Lejeunia*. In this group of *Jungermannia* there exists a series from *J. compressa* with a perianth almost completely overlaid, *J. scalaris* with it about one-third free, *J. stillicidiorum*, Raddi [*Southbya tophacea*, Spruce, in Ann. and Mag. Hist. s. 2. vol. 3. pl. iii.], with its perianth half free, *J. obovata* has its perianth still more so, and in *J. hyalina* one leaf only is usually combined with the perianth: *Aulicularia* is therefore only a modification of *Jungermannia*, chiefly remarkable for its overlaid or turbinate, tubular-mouthed perianths, and for the disappearance of its stipules in the formation of the involucrum, in place of their receiving, as is more usual, increased development. *J. rotata* was found in Lord Auckland's Islands, intermixed with *Plagiochila fuscella*, with which it appears to have been confounded by Dr. Taylor.—PLATE XCIV. Fig. 4:—1, plants, *natural size*; 2, a portion of the stem with leaves; 3, a leaf detached; 4, a perianth with capsule and involucral leaves; 5, a stipule:—*all magnified*.

Gen. II. PLAGIOCHILA, *Nees et Mont.*

1. Plagiochila *conjugata*, Hook. *Musc. Exot. t.* 91. *G. L. et N. Syn. Hep. p.* 52.

HAB. Middle Island: Dusky Bay, *Menzies*.

2. Plagiochila *connexa*, Hook. fil. et Tayl.; "caule implexo adscendente incurvo subramoso apice incrassato demum prolifero, foliis imbricatis oppositis verticalibus adpressis late orbiculatis connatis inferioribus integerrimis superioribus subdenticulatis, perigoniis terminalibus oblongis spicatis."—*Tayl. in Lond. Journ. Bot.* 1845, *p.* 79, *et* 1846, *p.* 266. *G. L. et N. Syn. Hep. p.* 648.

HAB. Northern Island: Bay of Islands, *A. Cunningham*.

"*Tufts* loose, yellowish-olive. *Stems* scarcely one inch high; shoots simple; leaves in a rapidly increasing series, nodding or incurved at the top; margins of the leaves subreflexed at their summits, slightly joined at their bases. *Perigonial shoots* nearly equalling the barren in breadth.—This can be confounded only with *P. Brauniana*, Ldbg.; but the leaves are more closely imbricated, the shoots wider, and the perigonia more considerable."—There are no specimens of this species in Hook. Herb.

3. Plagiochila *prolifera*, Mitten; caule repente, ramis erectis prolifero-ramosis, foliis fere verticalibus erecto-patulis oppositis coadunatis rotundatis dentatis, perianthio obovato compresso ore dentato, spicis masculis fasciculatis flagelliformi-attenuatis. (TAB. XCIV. Fig. 5.)

HAB. Northern Island: Bay of Islands; amongst *Sendtnera attenuata* (Mitten), *J. D. H.*

Caules bi-tripollicares. *Folia* remotiuscula, basi utrinque coadunata, marginibus dorsalibus integerrimis, basi in caulem læviter decurrentibus, cellulis minutissimis. *Perianthium* ore rotundato; foliis involucralibus spinuloso-dentatis.—Planta mascula parum gracilior, spicis plurimis.

Very closely resembling *P. opposita*, Nees (*P. zygophylla*, Tayl.), in size and habit, but evidently distinct in the decurrent combined dorsal bases of its leaves, and in the cells being about half the size. The involucral leaves and mouth of the perianth are also much less strongly toothed. *P. Brauniana*, Ldbg., has differently-formed leaves, perianth, and areolation.—PLATE XCIV. Fig. 5:—1, plants, *natural size*; 2, a portion of the stem with a pair of leaves; 3, a perigonial leaf enclosing an antheridium; 4, perianth and involucral leaf:—*all magnified*.

4. Plagiochila *falcata,* Hook. *Musc. Exot. t.* 89. *G. L. et N. Syn. Hep. p.* 649. Aulicularia occlusa, *Flor. Antarct. p.* 146. *t.* 62. *f.* 8.

Hab. Northern and Middle Islands: Dusky Bay, *Menzies.* Tararua mountains, and summit of Oparapara, *Colenso.* Port Preservation, *Lyall.* Also found in Campbell's Island.

A species in its larger forms nearly allied to *P. conjugata,* in its smaller to *P. ansata.* The small form named by Dr. Taylor *Aulicularia occlusa* is very different in appearance, but clearly connected by intermediate forms. The areolation is very unlike that of the *Aulicularia,* and resembles *J. compressa* only in size. No fructification has yet been observed; that figured in the 'Musci Exotici' has been pointed out by Dr. Taylor to belong to some *Aneura* accidentally mixed with the specimens.

5. Plagiochila *ansata,* Hook. fil. et Tayl., *Flor. Antarct. p.* 425. *t.* 156. *f.* 6.

Hab. Middle Island: Port William, growing amongst *Mastigobryum Novæ-Hollandiæ* (Nees), *Lyall.*

A native of the Falkland Islands.—It is stated in Flor. Antarct. that *J. colorata* differs from *P. ansata* (which it much resembles) in having its leaves "united into opposite pairs at their bases;" but as this has not been noticed by other authors, nor been observed in any of the many Antarctic specimens, it is evident that some other species was intended. Plants with perianths have been picked out of *Dicranum aciphyllum,* Hook. fil. et Wils., from Hermite Island; they are shorter than that figured in Flor. Antarct., and the perianths are obovate, compressed, the mouth truncate, denticulate. Involucral leaves somewhat ovate, dorsal margins entire, apex obliquely truncate, and having thus two obtuse angles, the ventral margin with four or five small teeth towards the base. The areolation of this species has a peculiar appearance, from the cells being interrupted with thick dark interstices; in this respect it differs from all its near allies, and approaches nearer to *P. circinalis,* Lehm. et Ldbg. (*P. hemicardia,* Flor. Antarct. p. 36, tab. lxiii. fig. 2, where however the magnified stem is represented too tall). The perianths in Lord Auckland's Island specimens are obconic, compressed, a little undulated above, the mouth entire, or, like the leaves, with here and there a small short tooth. Involucral leaves like the cauline, but larger and covering the perianth.

6. Plagiochila *microdictyon,* Mitten; caule repente, ramis erectis elongatis flexuosis prolifero-ramosis parce stoloniferis, foliis patentibus imbricatis deltoideo-ovalibus margine dorsali integerrimo recurvo in caulem longe decurrente, ventrali parce dentato vel integerrimo, involucralibus apice margineque ventrali breviuscule dentatis, perianthio oblongo compresso ore labiis apiculatis denticulatis. (Tab. XCIV. Fig. 6.)

Hab. Northern Island: Bay of Islands, with *P. prolifera,* amongst *Sendtnera attenuata, J. D. H.*

Rami bi-tripollicares. *Folia* e cellulis minutissimis viridibus subopacis areolata.

More nearly allied to *P. deltoidea,* Ldbg., than to any other, with however but little external resemblance; it is perhaps nearer to *P. retrospectans,* Nees. The form of its leaves is very nearly that of *P. deltoidea* and of several other species which, like *P. cristata,* Ldbg., have their leaves produced behind, giving the branches a triquetrous appearance. The cells of the leaves are very minute.—Plate XCIV. Fig. 6:—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, a leaf as seen at the side of the stem; 4, a perianth and involucral leaf:—*all magnified.*

7. Plagiochila *deltoidea,* Ldbg., *Sp. Hep. p.* 132. *t.* 27; *Syn. Hep. p.* 55. P. gregaria, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1844, *p.* 564. *Syn. Hep. p.* 654.

Hab. Northern and Middle Islands: Dusky Bay [*Herb. Lind.*]. Thomson's Sound, *Lyall.* On beech, Tararua and Ruahine mountains, *Colenso.* Bay of Islands, *J. D. H.*

Very variable in size, appearance, and in the direction and curvature of its leaves. Tall specimens (Dr. Lyall's) resemble *P. macrostachya,* Ldbg., others (from Colenso) are much more slender than the form figured in Sp. Hep. *P. gregaria,* Hook. fil. et Tayl., differs in appearance only; the form of the leaves and perianth is the same as usual.

8. Plagiochila *annotina,* Ldbg., *Sp. Hep. p.* 150. *t.* 32. P. adiantoides, *Hook. Musc. Exot. t.* 90.

Hab. Northern and Middle Islands: Dusky Bay, *Menzies.* On *Weinmannia* and *Fagus* bark, etc., Tarawera, *Colenso.* Port Nicholson, Southern Island, *Lyall.*

The annotinous appearance in the branches of this fine species, is chiefly evident in the male plants.

9. Plagiochila *radiculosa,* Mitten; caule repente, ramis prostratis latere ventrali radiculosis apicibus adscendentibus ramosis, foliis imbricatis patenti-divergentibus semicordatis apice bidentatis unidentatis integerrimisve margine dorsali paullulum reflexo ventrali basi dilatato cristato, involucralibus latioribus margineque ventrali denticulato, perianthio immaturo late obconico ore truncato denticulato. (TAB. XCVI. Fig. 1.)

HAB. Northern Island: on *Weinmannia* bark, Tarawera, *Colenso.*

Fusco-virens. *Rami* bi-tripollicares, innovationibus ramosi, radicellis ad basin perianthii pallidis. *Folia* explanata, dorso in caulem longe decurrentia; involucralia suborbicularia. *Perianthium* immaturum, compressum.

This resembles *P. Mauritiana,* Nees, and *P. repanda,* [Schw.] Ldbg., but differs from both in its decumbent or apparently dependent stems, which are also covered with rootlets on the ventral side. The mouth of the perianth too is truncate, and without any wing on the dorsal side. The cells of the leaves are larger than those of *P. Mauritiana,* and the leaves themselves wider near their bases, and more narrowed towards their apices.—PLATE XCVI. Fig. 1:—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, a portion of a leaf with cells; 4, a perianth with involucral leaves:—*all magnified.*

10. Plagiochila *incurvicolla,* Hook. fil. et Tayl.; caule repente, ramis suberectis flexuosis parum ramulosis apicibus decurvis, foliis ovatis semicordatisve patentibus margine dorsali recurvo remote dentato margine ventrali apiceque spinoso-dentato, perianthio oblongo-clavato compresso ore labiis rotundatis dentatis. —*Lond. Journ. Bot.* 1844, *p.* 564. *Syn. Hep. p.* 651. (TAB. XCVI. Fig. 2.)

HAB. Northern and Middle Islands: Auckland, *Sinclair.* Wairarapa valley, *Colenso.* Port Preservation and Milford Sound, *Lyall.*

Fusco-viridis. *Caulis* intricatus. *Rami* biunciales, flexuosi, vage ramulosi. *Folia* rigidula, areolis minutis. *Perianthium* 2 lin. longum, angustum. *Capsula* parva, breviter pedicellata.

Not unlike some states of *P. fasciculata* in general appearance, but wanting the fasciculate branches of that species. The leaves are of nearly the same form as those of *P. spinulosa* and *P. fasciculata,* but their dentate dorsal margin distinguishes this species from all its allies.—PLATE XCVI. Fig. 2:—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, a leaf detached from the stem; 4, a portion of the same with cells; 5, perianth and capsule:—*all magnified.*

11. Plagiochila *Lyallii,* Mitten; caule repente, ramis erectis dichotome subfasciculatim ramosis, foliis subremotis imbricatis late ovatis vel semicordatis margine dorsali integerrimo decurvo ventrali deflexo apiceque spinoso-dentato involucralibus conformibus argutius dentatis, perianthio late obconico compresso ore spinuloso-denticulato. (TAB. XCVI. Fig. 4.)

HAB. Northern and Middle Islands: amongst *Sendtnera flagellifera.* Port Preservation, *Lyall.* Auckland, *Sinclair.*

Rami tripollicares, graciles, flexuosi; fœminei dichotomi; masculi fasciculati, partes juniores intensius fuscovirentes, vetustiores pallide fusci. *Folia* rigidula, minutissime areolata, perigonialia parva, imbricata, apice trispinosa.

This slender species has much resemblance to *P. fasciculata,* Ldbg., but is of a different habit: the leaves are more rigid, not altered in their position when dry, and more minutely areolate. *P. incurvicolla* differs in the denticulate dorsal margins of its leaves.—PLATE XCVI. Fig. 4:—1, male and female plants, *natural size;* 2, a portion of the stem with leaves; 3, a leaf detached from the stem, as seen on the underside; 4, a perianth and involucral leaf; 5, a portion of a male spike, with perigonial leaves; 6, a portion of a leaf with cells:—*all magnified.*

12. Plagiochila *fasciculata,* Lind., *Sp. Hep. t.* 1; *Syn. Hep. p.* 27 *et* 630.

HAB. Northern and Middle Islands: Bay of Islands, *J. D. H.* Port Nicholson and Port Underwood, *Lyall.* Wellington, *Stephenson.* On trees, Tehawera, *Colenso.*

13. Plagiochila *Arbuscula*, Lehm. et Lind., *Lind. Sp. Hep. t.* 4. *G. L. et N. Syn. Hep. p.* 27.

HAB. Throughout the Islands, abundant, *Cunningham, etc.*

A large and handsome species, of which some specimens, gathered by Mr. Stephenson, are more than six inches high; it is found in Java, and specimens, said to be from Jamaica, are in Herb. Lindenberg.

14. Plagiochila *Sinclairii*, Mitten; ramis erectis parce divisis strictis, foliis laxe imbricatis patenti-divergentibus semiovato-oblongis obtusis margine dorsali reflexis integerrimis ventrali apiceque dentato-ciliatis, perianthio terminali oblongo-obovato compresso ore truncato dentato. (TAB. XCVI. Fig. 5.)

HAB. Northern Island: Auckland, *Sinclair*. Bark of trees, Tehawera, *Colenso*.

Rami 4–5 unc. longi, innovationibus parce ramosi. *Folia* inferiora rotundata, remotiuscula, superiora sensim majora, laxe imbricata, margine ventrali ubique dentato-ciliato. *Perianthium* bilineare, compressum, ore dentibus longioribus ciliatum.

Very different from any other New Zealand species, and, so far as can be judged from the figures in Lindenberg's 'Species Hepaticarum,' more nearly allied to the West Indian *P. Breuteliana* and *P. flaccida*, Ldbg. The more numerous and much more slender ciliiform teeth, as well as the form of the leaves and perianth, abundantly distinguish the present from the larger forms of *P. deltoidea*, to which it has some external resemblance.—PLATE XCVI. Fig. 5:—1, a specimen, *natural size;* 2, a portion of the stem with leaf; 3, a perianth and involucral leaf: —*magnified.*

15. Plagiochila *Stephensoniana*, Mitten; caule repente, ramis erectis elatis bi-tripinnatim ramosis filicoideis, foliis ovatis late semicordatisve apice subquadratis margine dorsali parum recurvo integerrimo ventrali apiceque spinuloso-dentato, involucralibus conformibus argutius dentatis, perianthio ovato compresso ore denticulato. (TAB. XCV.)

HAB. Northern and Middle Islands: ravines near Wellington, *Stephenson*. Thomson's Sound, Port Cooper, and Port Nicholson, *Lyall*. Ruahine mountains and East Coast, *Colenso*.

Rami 4–8-pollicares. *Folia* imbricata, apice subtruncata vel quadrata. *Perianthia* numerosa in ramulis propriis brevibus.

A splendid species, unsurpassed in its noble size and fern-like ramification. In habit it appears to agree with *P. Javanica*, Nees et Mont., and *P. Belangeriana*, Ldbg.; but it differs from both in its shorter and wider leaves, and in its ovate perianth, which has its mouth somewhat contracted, and its lips rounded. It appears to be common in New Zealand, and small specimens gathered in Lord Auckland's Islands were distributed as *P. aculeata*, Tayl.—PLATE XCV. 1, 2, male and female plants, *natural size;* 3, a portion of the stem with leaves; 4, a perianth with involucral leaves and capsule:—*both magnified.*

16. Plagiochila *gigantea*, Lind., *Sp. Hep. t.* 24. *G. L. et N. Syn. Hep. p.* 51. *Hook. Musc. Exot. t.* 93.

HAB. Common throughout the Islands, *Menzies, etc.*

Very common, but only in New Zealand, and generally fertile. It has a proliferous habit, especially the male plants, and varies but little, except in size. The branches spring from near the same part of the stem, and being nearly of equal length, the fronds have a flabellate outline. *P. Chonotica*, Tayl., is nearly allied to *P. gigantea*, and corresponds in every respect with *P. Neesiana*, Lind. Sp. Hep. t. 13.

17. Plagiochila *ramosissima*, Lind., *Sp. Hep. t.* 16. *G. L. et N. Syn. Hep. p.* 58. *Hook. Musc. Exot. t.* 92.

HAB. Middle Island: Dusky Bay, *Menzies*. Port Preservation, *Lyall*.

Dr. Lyall's specimens are much smaller and less branched, they also produce a few flagellæ, but in all other respects correspond with those of Menzies. *P. minutula* (Fl. Antarct. t. clvii. fig. 1) may perhaps be a young state of this: the outline of the leaves is very similar, though erroneously described as obovate, but their areolation is not exactly the same.

18. Plagiochila *Dicksoni*, Hook. fil. et Tayl.; caule repente, ramis erectis ramosis flexuosis dendroideis, foliis patentibus ovato-oblongis apice truncato-bi-tridentatis margine dorsali recurvo integerrimo ventrali parce dentato, involucralibus latioribus spinoso-dentatis, perianthio obovato compresso labiis rotundatis denticulatis. (Tab. XCVI. Fig. 3.)

Hab. Northern and Middle Islands: common, *Menzies, Colenso, Stephenson, Lyall, etc.*

Luteo-virens. *Rami* 2–3-pollicares. *Folia* subremota, laxe imbricata, margine dorsali arcuato, ventrali subrecto, 4–5-dentato, apice oblique truncato, bi- vel tridentata. *Perianthium* elongato-obovatum. *Plantæ masculæ* ramulis gracilioribus, spicis interruptis. *Folia perigonialia* imbricata, apice argute bi-tridentata.

The species here referred to *P. Dicksoni* differs from it apparently only in habit; in the form of the leaves, denticulation, areolation, and direction, they entirely agree.—Plate XCVI. Fig. 3:—1, male and female plants, *natural size;* 2, a portion of the stem with leaves; 3, a portion of the leaf with cells; 4, a perianth and involucral leaf: —*all but fig.* 1 *magnified.*

19. Plagiochila *pleurota*, Hook. fil. et Tayl., *Fl. Antarct. p.* 149. *t.* 63. *f.* 4. P. cognata, *l. c. p.* 36. *t.* 62. *f.* 3.

Hab. Middle Island: Port William, amongst *Metzgeria furcata* (Nees), *Lyall.*

The specific name, *pleurota*, has been retained because it gives the best idea of the plant. *P. pleurota* was described from *P. cognata* with perfect perianths, which are hardly alate, but variously and strongly keeled: these keels I find in the young perianth of *P. cognata*, whose leaves are a little larger and more distinctly dentate than in *P. pleurota*. I do not find the smallest difference in the areolation. *P. cognata* is stated to have much affinity with *P. decipiens*, Hook., but this I do not recognize. *P. pleurota* is, it appears to me, compared correctly with *P. cognata*, but not with *P. gymnocalycina*, Nees et Mont. The closest affinity exists between the present species and *P. Dicksoni*, as well as *P. hirta*, Tayl. MSS.*; all possess the same yellowish-green colour and nearly correspond in areolation, which, although not remarkably small, has an opaque appearance.

Gen. III. LEIOSCYPHUS, *Mitten.*

Perianthium terminale, læve, compressum, superne dilatatum, ore truncato integro vel dentato. *Involucri folia* et *amphigastria* caulinis similia. *Involucra mascula* spicæformia vel e surculo in medio ramo. *Folium perigoniale* basi saccatim incurvum.—Caulis *prostratus, repens, adscendensve, divergenti-ramosus.* Folia *succuba, fere horizontalia, ut plurimum integra, rarius bifida, succulenta, retis maculis majusculis intercalaribus sæpe valde conspicuis.* Amphigastria *parva, bi-quadrifida, basi sæpe in folia subjecta decurrentia.* Plantæ *concinnæ, cæspitosæ vel inter Muscos repentes, pallidæ vel fuscescentes.*—Leptoscyphus, *Mitten in Lond. Journ. Bot.* 1851, *p.* 358.

1. Leioscyphus *repens*, Mitten; caule repente vage ramoso, foliis imbricatis ovatis apice sinu parvo obtuso bidentatis, amphigastriis parvis profunde bifidis laciniis subulatis extus unidentatis basi utrinque

* *P. hirta*, Tayl. MSS.; caule ramisque subfasciculatis setis brevibus dense vestitis, foliis oblongo-ovatis remotiusculis apice subbidentatis margine dorsali integerrimo latius recurvo ventrali apicem versus dentibus binis vel tribus decurvis armato.

Hab. Falkland Islands; growing among tufts of *Dicranum aciphyllum.* Hermite Island, amongst *Jungermannia madida, J. D. H.*

Rami pollicares bipollicaresve, setis brevibus articulatis vestiti. *Folia* patentia vel erecto-patentia, marginibus decurvis et apicem versus tantum dentata.

A small and slender species, very near, and possibly a state of, *P. acanthocaulis*, Sullivant in Lond. Journ. Bot. 1850, p. 317; yet it differs from the description there given in its leaves not being obovate, and in their margins being entire except at the apex and just below it on the ventral side.

in folia subjecta anguste decurrentibus, perianthio elongato-obovato compresso ore dentato, foliis perichætialibus caulinis conformibus. (Tab. XCVII. Fig. 1.)

Hab. Northern Island: Bay of Islands; creeping over *Lepidozia Lindenbergii*, *J. D. H.*

Pallide viridis. *Caulis* pollicaris. *Folia* patentia, margine dorsali recto, ventrali arcuato, cellulis rotundatis, intercalaribus minutis in senioribus sæpe obsoletis.

Nearly resembling *Lophocolea bidentata* in size and habit, but readily distinguished from this and every allied species by the form of its perianth.—Plate XCVII. Fig. 1:—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, a portion of the stem with stipule, as seen on the ventral side; 4, a perianth and involucral leaves; 5, a perianth detached:—*all magnified.*

Gen. IV. LOPHOCOLEA, *Nees.*

1. Lophocolea *heterophylloides*, Nees, *Syn. Hep. p.* 157.—Chiloscyphus canaliculatus, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1844, *p.* 563. *G. L. et N. Syn. Hep. p.* 710.

Hab. Northern Island: Bay of Islands, *J. D. H.* Cook's Straits, Lake Rotoatara, Mohaka River, etc., *Colenso;* running streams, Canterbury Plains, *Lyall.*

This appears to be a common and variable species. *Chiloscyphus canaliculatus* is a fragrant variety, with the leaves so arranged as to give a canaliculate look to the stems, but it does not differ from *Jungermannia recubans*, Tayl., which can hardly be regarded as a variety of *L. heterophylloides.* The genus *Lophocolea* is here defined (as in 'Synopsis Hepaticarum') by a terminal triquetrous perianth; and if, as does sometimes happen, a perianth is formed on a short lateral branch, there is still no difficulty in distinguishing it from the perianth of *Chiloscyphus*, which is never of a prismatic form, but, in those species in which it becomes highly developed, more of an urceolate figure. These distinctions have not been sufficiently kept in view, so that in the Synopsis itself there may be found *Chiloscyphi* amongst the *Lophocoleæ*, and *vice versâ.* In describing his *Chiloscyphus canaliculatus*, Dr. Taylor states that the perianth is compressed and bilabiate, but in the original specimen they are triquetrous.

2. Lophocolea *Novæ-Zelandiæ*, Nees, *G. L. et N. Syn. Hep. p.* 168.—L. grisea, *Hook. fil. et Tayl. Flor. Antarct. p.* 154. *t.* 64. *f.* 8, *et t.* 160. *f.* 4. L. subviridis, *t.* 159. *f.* 4. L. rivalis, *t.* 158. *f.* 7. L. sabuletorum, *t.* 158. *f.* 8, *et* Lejeunia subintegra, *t.* 160. *f.* 5.

Hab. Northern and Middle Islands: Dusky Bay, *Herb. Lehmann.* Bay of Islands, *Sinclair.* Auckland and Port Nicholson, *Lyall.* East Coast and interior, *Colenso.*

An extremely variable plant, common in all the Antarctic islands. In all the forms with rounded leaves the stipules are simply bidentate; but in those in which the leaves become obtusely bidentate the stipule gradually assumes the form found in *L. bidentata.* The *L. grisea* α, and *L. subviridis*, differ only in their smaller size from the original specimen of *L. Novæ-Zelandiæ* in Herb. Lehmann; *L. grisea* β and *Lejeunia subintegra* are male plants. *Lophocolea rivalis* and *L. sabuletorum* agree in the form of their leaves and stipules, but differ in size, *L. rivalis* being to all appearance an aquatic state. Besides these there is another form with a habit more nearly that of the European *L. heterophylla* [Schrad.], and powerfully fragrant, yet which, in all essential characters, corresponds with the other states. The cause of the odour exhaled from this and some other *Hepaticæ* is not yet ascertained; in *L. heterophylloidea* it is not constantly present, and it appears to be accompanied by a yellow hue, which, like that of some *Radulæ*, is imparted to water.

3. Lophocolea *pallida*, Mitten; caule prostrato parce ramoso, foliis ovatis apice obtusis retusis sinu parvo bidentatisve cum amphigastriis quadridentatis utrinque coalitis, perianthio prismatico angulis alato apice angulisque plus minus dentato, foliis involucralibus vel caulinis conformibus vel margine ventrali dentatis, amphigastrio involucrali ovato bifido laciniis fere integerrimis spinoso-dentatisve.—Lophocolea multipenna, *Hook. fil. et Tayl. Flor. Antarct. p.* 155 (quoad descriptionem perianthii).

Hab. Northern Island: Auckland, *Sinclair*.

Pallide viridis, interdum fere albida. *Caulis* pollicaris, linearis, simplex, rariusve ramosus. *Folia* imbricata, fere opposita, ut plurimum bidentata, dente marginis ventralis longiore, rarissime tridentata, e cellulis magnis interstitiis grossiusculis areolata. *Amphigastria* parva, omnia conformia, cauli appressa. *Perianthium* sæpe laterale, subsessile, triquetrum, angulo dorsali latius alatum, alis superne dentatis. *Folia involucralia* cum amphigastrio latiusculo coalita, varie dentata. *Odor* plantæ suavis, terebinthinus.

The much larger cells of the leaves of this species afford a character by which it may be easily distinguished from *L. lenta* and *L. subporosa*, which approach it in size; the general appearance of the plants is more nearly that of some small *Chiloscyphi*. The specimens of *L. multipenna* from Lord Auckland's Islands, and preserved in the Hookerian Herbarium, appear to consist for the most part of sterile plants of *Leioscyphus decipiens*, Mitten MSS. (a plant which was also confounded with *Lophocolea pallide-virens* from Cape Horn), and a small white fertile state of *Lophocolea pallida*, to which the description of the perianth belongs, whilst all that relates to the leaves and stipules seems to have been taken from the first.

4. Lophocolea *lenta*, Hook. fil. et Tayl.; caule repente, vage ramoso, foliis ovato-oblongis emarginato-bidentatis dentibus subulato-attenuatis, amphigastriis parvis profunde bifidis laciniis angustis extrorsum unidentatis, perianthio elongato angulis angustissime alatis apice laciniis bipartitis spinuloso-dentatis, foliis involucralibus margine dorsali recurvo ventrali flexuoso unidentato, amphigastrio elliptico profunde bifido laciniis angustis utrinque extrorsum unidenticulato.—*Flor. Antarct. p.* 154. L. diademata, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1844, *p.* 560. *G. L. et N. Syn. Hep. p.* 692. L. secundifolia, *l. c. p.* 438. *t.* 159. *f.* 2. (Tab. XCVII. Fig. 2.)

Hab. Northern Island: Bay of Islands, *J. D. H.* Wairarapa valley, East Coast, etc., *Colenso*.

Caulis ½–1-pollicaris. *Folia* explanata, vel sursum conniventia. *Amphigastria* caule paulo latiora. *Perianthium* prismaticum, angulo dorsali latius alato, ala remote dentata. *Folia perigonialia* imbricata, adpressa, erecta, basi ventricosa, apice squarrosa.

This small species is a native of Lord Auckland's Group and of Fuegia, and agrees in habit with *L. bidentata*, but is scarcely half its size, being scarcely larger than *L. bicuspidata*. The *L. secundifolia* of Flor. Antarct., and *L. diademata*, Lond. Journ. Bot., although differing a little in appearance, do not present any character whereby they can be distinguished, and to these might perhaps be added *L. perpusilla*. *L. bispinosa* agrees very nearly in all other respects, but differs in its smaller areolation. Dr. Taylor describes the perianth as bilabiate, with the lips unequal; but in all the plants here referred to *L. diademata*, as well as in the original specimens, the perianth is equally trilabiate, as is usual in the genus, and seems to have each of the lips divided into two principal laciniæ.—Plate XCVII. Fig. 2:—1, plants, *natural size*; 2, a portion of the stem with leaves; 3, stipules removed from the stem; 4, a perianth and involucral leaves; 5, involucral leaves, and stipule detached:—*all magnified*.

5. Lophocolea *bidentata*, Nees, *G. L. et N. Syn. Hep. p.* 159.—L. recurvifolia, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1844, *p.* 562. *G. L. et N. Syn. Hep. p.* 693. L. leptantha, *Flor. Antarct. p.* 439. *t.* 159. *f.* 6. L. divaricata, *l. c. t.* 161. *f.* 8, *et* L. alternifolia, *l. c. t.* 161. *f.* 2.

Hab. Northern Island: Bay of Islands, *J. D. H.*

Of the plants here referred to *L. bidentata*, none possess any character of sufficient importance to distinguish them from European states of that species. *L. alternifolia* and *L. recurvifolia* are without fruit. *L. leptantha* and *L. divaricata* are states of *L. bidentata* in which the perianth is alate. The simply bifid stipules of *L. recurvifolia* is not a constant character, nor is it rare to find plants of *L. bidentata* which have bifid stipules, and thin lower parts. It may be reasonably inferred, from the remote habitats already recorded, that *L. bidentata* is cosmopolite.

Lophocolea textilis, from Cape Horn, although possessing all the habit and appearance of *L. bidentata*, is probably a distinct species, the areolation being more lax, and the cells having a more vitreous look. *L. humifusa*, from

Kerguelen's Land, has a perianth not at all alate, and with its mouth more shortly dentate than has been observed in *L. bidentata;* the cauline leaves, too, are rather different in form, and have a tendency to become more or less rounded at their apices, as in *L. heterophylla.*

6. Lophocolea *spinifera,* Hook. fil. et Tayl.; perianthio ovato triquetro angulis alatis superne dentatis ore truncato labiis dentato-laceris, foliis amphigastrioque involucralibus toto ambitu spinoso-dentatis dentibus recurvis.—*Flor. Antarct. p.* 155. *t.* 65. *f.* 1.

Hab. Northern Island: Ruahine mountains, *Colenso.*

7. Lophocolea *subporosa,* Mitten; caule repente ramoso, foliis ovatis sinu rotundato bidentatis integerrimis, amphigastriis quadridentatis basi uno latere vel utrinque cum foliis subjectis anguste coalitis, perianthio prismatico angulo dorsali alato ala denticulata ore laciniis obtusiusculis integris denticulatis, foliis involucralibus conformibus parum latioribus margine dorsali ventralique parce dentatis amphigastrio subelliptico bidentato lateribus remotiuscule dentatis basi anguste coalitis. (Tab. XCVII. Fig. 3.)

Hab. Northern Island: Auckland, *Sinclair;* creeping amongst Mosses. Wellington, *Stephenson in Herb. Mitten.*

Pallide viridis. *Caulis* uncialis. *Folia* imbricata, rigidula, e cellulis inæqualibus quasi punctata.

Near as this small species unquestionably is to *L. diademata* in size and habit, it appears to differ in its thicker and more rigid texture, its wider and less deeply emarginate leaves, and in the undivided and obtuse laciniæ of the perianth. The decurrence of the stipule into the leaves is seen more readily in the fertile stems, but it is also to be found occasionally in the sterile, where however one leaf is generally free.—Plate XCVII. Fig. 3:—1, plants, *natural size;* 2, a portion of the stem with leaves; 3, a stipule; 4, a perianth and involucral leaves; 5, involucral leaves and stipule:—*all magnified.*

8. Lophocolea *biciliata,* Mitten; fuscescens, caule (unciali) procumbente subsimplici, foliis latis complanatis laxe imbricatis late ovatis deltoideo-ovatisve apice subtruncatis bidentatis sinu obtusissimo, amphigastriis parvis profunde bipartitis segmentis extus unidentatis basi uno latere in folium subjectum decurrentibus.—Chiloscyphus biciliatus, *Hook. fil. et Tayl. in Lond. Journ. Bot.* 1845, *p.* 84. *Syn. Hep. p.* 707. (Tab. XCVII. Fig. 4.)

Hab. Northern Island, *Colenso.*

This species was described as a *Chiloscyphus,* but may rather be considered a *Lophocolea,* from its habit, its tendency to form involucral leaves, and an increase in the size of the stipules towards the apex, observed on one of the stems. It approaches in size the larger forms of *L. bidentata,* but has wider leaves, with more ciliiform teeth, and a thinner, more vitreous texture. More perfect specimens of this plant would probably exhibit the stipule combined on both sides with the subjacent leaves, as in *L. Martiana,* Nees, a species to which must be referred the *L. pertusa* and *Chiloscyphus jugulifolius* of Taylor; the latter is founded on a barren specimen, but, so far as it is possible to judge, it differs in no respect from the common South American plant.—Plate XCVII. Fig. 4:—1, a plant, *natural size;* 2, a portion of the stem, with leaves and stipule:—*magnified.*

9. Lophocolea *allodonta,* Hook. fil. et Tayl., *Flor. Antarct. p.* 155. *G. L. et N. Syn. Hep. p.* 163 *et* 693. (Tab. XCVII. Fig. 5.)

Hab. Northern Island: on *Weinmannia,* at Tarawera, *Colenso.*

An obscure species, found in Lord Auckland's Islands, distinguished from its near allies in size and habit by its simply bipartite stipules, of which the segments are lanceolate: the plants only resemble *Calypogeia Trichomanis,* Raddi, in the powerful piperaceous odour which they exhale. The areolation consists of rather large cells surrounded by thick interstices.—Plate XCVII. Fig. 5:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipule:—*magnified.*

10. Lophocolea *textilis,* Hook. fil. et Tayl., *Flor. Antarct. p.* 435. *t.* 158. *f.* 9.

Hab. Northern Island: Ruahine mountains, *Colenso*.

11. Lophocolea *Colensoi*, Mitten; caule repente vage ramoso, foliis imbricatis ovato-oblongis integerrimis apice truncato-bidentatis, amphigastriis profunde bipartitis segmentis extus bidentatis basi utrinque folio inferiore coalitis. (Tab. XCVII. Fig. 6.)

Hab. Northern Island: on rotten wood, East Coast, *Colenso*.

Fusco-virens. *Caulis* bi-triuncialis. *Folia* explanata, breviter bidentata, interdum dentibus obsoletis. *Amphigastria* sex- rarius quadri-dentata.

The largest *Lophocolea* yet known; the specimens owe their fine appearance, in part, to having grown on decayed wood; a circumstance which usually increases the size of the European species. The present is allied to *L. pallide-virens* [Chiloscyphus, *Flor. Antarct. t.* 159. *f.* 9], but the leaves are of a different form, and their apices wider. In *L. pallide-virens* the stipules are narrowly decurrent on both sides into the subjacent leaves, and the perianths are occasionally terminal; but the lateral perianths are altogether those of *Lophocolea*, and in this respect it corresponds with some states of *L. bidentata*. The *L. Beecheyana*, Taylor, from Oahu, differs from *L. connata*, Sw., in its involucral leaves and stipule being furnished with numerous ciliiform teeth. *L. humistrata*, Tayl., from St. Helena, has its leaves truncate at their apices, and mostly without the spiniform teeth; yet both this and the preceding are so closely allied to *L. connata* in all other respects, that it may be doubted if they are not mere forms of that species.—Plate XCVII. Fig. 6:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipule:—*magnified.*

12. Lophocolea *triacantha*, Hook. fil. et Tayl.; caule implexo repente vage ramoso, foliis patentibus complanatis adproximatis basi late adnatis subdecurrentibus ovato-quadratis tricuspidatis, amphigastriis palmato-quadrifidis segmentis setaceis.—*Lond. Journ. Bot.* 1846, *p.* 386. *G. L. et N. Syn. Hep. p.* 698. (Tab. XCVII. Fig. 7.)

Hab. Northern and Middle Islands: Akaroa, *Raoul*. Hills, Pahiatua, *Colenso*.

Pallide virens vel fuscescens. *Caulis* biuncialis, parce ramosus. *Folia* explanata, late ovata. *Amphigastria* parva, uno latere in folium inferius anguste decurrentia.

This species is readily distinguished from all its congeners, by its trispinose leaves. In habit it agrees nearly with *L. bidentata*, but no fructification has been seen. It has considerable resemblance to *Chiloscyphus combinatus*, Nees, but its leaves are of a thinner texture, and the teeth are more slender and longer; in the same respects it also differs from *C. Endlicherianus*, Nees.—Plate XCVII. Fig. 7:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipule:—*magnified.*

13. Lophocolea *leucophylla*, Tayl., *G. L. et N. Syn. Hep. p.* 155. Chiloscyphus leucophyllus, *Hook. fil. et Tayl. in Lond. Journ. Bot.* 1844, *p.* 384. *Flor. Antarct. p.* 157. *t.* 65. *f.* 4. *G. L. et N. Syn. Hep. p.* 181 *et* 706.

Hab. Northern Island: top of Ruahine mountains, *Colenso*.

A curious species, of which the New Zealand specimens are very much finer than those from Lord Auckland's Islands, and in some elongated stems are three inches high. The perianth is triquetrous and terminal, its laciniæ rather obtuse, entire, the margin denticulate. The involucral leaves and stipule differ little from those of the stem. Excepting therefore the papillose surface of its leaves, this species is allied to *L. Gaudichaudii*, Mont., from the Sandwich Islands, *L. Columbica*, Gottsche, and *L. Orbigniana*, Nees et Mont., from Peru and Bolivia. It appears to be exceedingly variable in size, some stems being scarcely half an inch high, and slender or stout, but the specific characters appear to be very constant.

14. Lophocolea *muricata*, Nees, *G. L. et N. Syn. Hep. p.* 169 *et* 703.

Hab. Northern and Middle Islands: amongst Mosses, Wellington, *Stephenson*. Port William, *Lyall*. Woods, Tehawera, and Ruahine mountains, *Colenso*.

Gen. V. CHILOSCYPHUS, *Corda.*

1. Chiloscyphus *decipiens*, Gottsche; "caule procumbente ramosiusculo, foliis ovato-deltoideis margine ventrali arcuato inflexo in apicem obtusum subintegerrimum abeunte, dorsali rectiusculo decurrente basin versus dentato libero [ad $\frac{1}{4}$ partem a caule soluto], amphigastriis reniformi-transversalibus utrinque cum foliis subjectis connatis toto margine involuto cucullatis," perianthio ovato-oblongo plicato ore labiis rotundatis denticulatis, foliis involucralibus integris denticulatis.—*G. L. et N. Syn. Hep. p.* 176. *Gotts. Ic. Hep. ined.*

Hab. Northern and Middle Islands: Dusky Bay, amongst *C. Billardieri* [*Herb. Lehmann*]. Port Preservation, in fine fruit, *Lyall*. Creeping amongst *Gymnanthe saccata*, Tararua, *Colenso*.

Folia involucralia rotundata, remotiuscule denticulata. *Amphigastrium involucrale* ovatum, apice retusum, integerrimum.

A species readily distinguished from all others by the form of its leaves and stipules, which are of a rather thick and fleshy texture.

2. Chiloscyphus *Menziesii*, Mitten; caule repente ramoso, foliis oppositis latissime ovatis obtusis integerrimis dorso connatis a ventre cum amphigastriis ovatis apice bidentatis marginibus extus obtusiuscule tridenticulatis connexis, involucri foliis concavis denticulatis, perianthio campanulato ore laciniis brevibus incurvis. (Tab. XCVIII. Fig. 1.)

Hab. Picked from a Lichen gathered in New Zealand by *Mr. Menzies* (*Hb. Mitten*). On the bark of trees with *Polyotus Taylori* and *Gottschea tuloides*, Port Preservation, *Lyall*.

Fusco-viridis. *Caulis* uncialis, flexuosus. *Folia* imbricata, fere semi-orbicularia, crassa, carnosula, cellulis parvis rotundis. *Amphigastria* apice sinu obtuso, basi latiuscule cum foliis coalita.

A smaller species than *C. decipiens*, without the thick appearance so striking in that species. In the form of the stipule it comes near the East Indian *C. perfoliatus*, Nees, and *C. decurrens*, Nees. The areolation is composed of rounded cells without intercalary spaces. This species has been picked from amongst *Hepaticæ* from Lord Auckland's Islands.—Plate XCVIII. Fig. 1:—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, a portion of the leaf with cells; 4, a perianth with involucral leaves:—*all magnified.*

3. Chiloscyphus *chlorophyllus*, Mitten; caule repente ramoso, foliis imbricatis ovatis apice sinu parvo rotundato bicuspidatis margine dorsali integerrimo ventrali apicem versus 1–2-dentato, amphigastriis ovatis apice brevi-bidentatis lateribus dentibus duobus parvis instructis, perianthio campanulato ore laciniis spinoso-dentatis, foliis amphigastrioque involucralibus conformibus denticulatis.—Lophocolea chlorophylla, *Hook. fil. et Tayl. in Lond. Journ. Bot.* 1844, *p.* 562. *G. L. et N. Syn. Hep. p.* 698. (Tab. XCVIII. Fig. 2.)

Hab. Northern Island: Bay of Islands, *J. D. H.*

Pallide virens et fuscescens. *Caulis* $\frac{1}{2}$-pollicaris. *Folia* ad apices ramorum majora et antice conniventia. *Amphigastria* a foliis omnino discreta, cauli adpressa. *Perianthium* ore aperto, laciniis brevibus. *Capsula* ovalis.

A small plant, with more the habit and look of a *Lophocolea* than of the present genus. The perianths were overlooked on the specimens originally described; they agree with those of *Chiloscyphus*. This species is allied in size and general appearance to *C. physantha*, but is rather smaller, and sufficiently distinct in the form of its leaves and stipules. In areolation it approaches nearly to *C. Menziesii* and *C. decipiens*.—Plate XCVIII. Fig. 2:—1, plants, *natural size;* 2, a portion of the stem with leaves; 3, a stipule detached from the stem; 4, a perianth with capsule and involucral leaves; 5, involucral leaves and stipule detached:—*all magnified.*

4. Chiloscyphus *Billardieri*, Nees, *G. L. et N. Syn. Hep. p.* 175 *et* 704. *Hook. Musc. Exot. t.* 61.

Hab. Northern and Middle Islands. Var. *α*. Bay of Islands, *J. D. H.* Var. *β*. Dusky Bay, *Menzies*. Tararua, *Colenso, etc.* Port Preservation and Port Cooper, *Lyall*.

This fine species varies considerably in the toothing of its leaves and stipules; in some specimens the ventral margin is entire, in others with more closely-set teeth than the dorsal; their apices are also rounded or bidentate. The dorsal bases of the leaves are generally combined, but in the specimen from Mr. Colenso they are separated by one-fourth of the diameter of the stem, and placed one above the other. Colour varying from a pale green to a deep brown.

5. Chiloscyphus *fissistipus*, Hook. fil. et Tayl., *Flor. Antarct. p.* 45. *Syn. Hep. p.* 175 *et* 704.

HAB. Northern Island, *Colenso.* Auckland, *Col. Bolton.*

Also found in Lord Auckland's Group.

6. Chiloscyphus *Lyallii*, Mitten; caule repente elongato vage ramoso, foliis trapezoideis apice truncato-bidentatis margine dorsali integerrimo rarius denticulo apicem versus instructo ventrali spinuloso-dentato, amphigastriis profunde bipartitis segmentis spinosis basi utrinque in folia subjecta decurrentibus. (TAB. XCVIII. Fig. 3.)

HAB. Middle Island: growing with *C. coalitus* (Hook.), Port Preservation, *Lyall.*

Pallide viridis, tener. *Caulis* bi-triuncialis. *Folia* imbricata, marginibus dorsalibus suboppositis, ventralibus plerisque quadrispinosis cum amphigastrio coalitis. *Amphigastria* segmentis intus uni- extus bispinosis.

This fine species resembles in some characters *Lophocolea trapezoidea*, Mont., from Peru and Guadeloupe, but differs in its more lax areolation and less ciliate stipules. From *L. biciliata*, the only New Zealand species to which it has any resemblance, it differs in the denticulation of the ventral margins of its leaves.—PLATE XCVIII. Fig. 3:—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, portion of leaf with cells:—*both magnified.*

7. Chiloscyphus *aculeatus*, Mitten; caule repente ramoso, foliis imbricatis connatis ovatis apice sinu obtuso bidentatis margine dorsali medio unispinoso ventrali bi-tri-sponoso, amphigastriis transverse oblongis quadrispinosis cum foliis subjectis late coalitis. (TAB. XCVIII. Fig. 4.)

HAB. New Zealand: creeping over *Hypopterygium concinnum* (*Herb. Mitten*).

Viridis. *Caulis* pollicaris. *Folia* opposita, dorso marginibus coalitis paullulo decurrentibus rectiusculis, apice spinoso-bidentato. *Amphigastria* æqualiter quadrispinosa.

A small but very distinct species, of which a few fragments are all that have yet been seen.—PLATE XCVIII. Fig. 4:—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, portion of leaf with cells:—*both magnified.*

8. Chiloscyphus *trispinosus*, Mitten; caule repente ramoso, foliis ovato-trapezoideis apice truncato-bidentatis margine dorsali integerrimo ventrali medium versus unispinoso, amphigastriis bipartitis segmentis bi- vel tri-spinosis basi utrinque cum foliis subjectis anguste coalitis. (TAB. XCVIII. Fig. 5.)

HAB. Middle Island: Bligh's Sound; creeping over *C. coalitus*, etc., *Lyall.*

Pallide viridis, subpellucida. *Caulis* pollicaris et longior, subsimplex vel ramis adproximatis, vage ramosus. *Folia* explanata, imbricata, subopposita, dentibus brevibus spinosis, sublaxe reticulata, succosa, cellulis majusculis, interstitiis angustis. *Amphigastria* brevia, sinu rotundato, bipartita, basi in folia decurrentia. *Odor* gravis, aromaticus.

Very closely resembling *C. odoratus*, but a little more laxly areolate. Fructification unknown. The genus of this and the preceding is hence uncertain; they have more of the texture of *Calypogeia Trichomanis* than of any known *Lophocoleæ* or *Chiloscyphi*. The present species bears short male spikes scarcely protruding beyond the leaves, composed of ventricose bidentate leaves, but without anthers.—PLATE XCVIII. Fig. 5:—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, portion of leaf with cells:—*all magnified.*

9. Chiloscyphus *odoratus*, Mitten; caule repente vage ramoso crassiusculo, foliis oblongo-ovatis apice spinoso-bidentatis, amphigastriis parvis profunde bipartitis segmentis extus unidentatis basi utrinque in folia subjecta auguste decurrentibus, perianthio campanulato ore dentata. (TAB. XCVIII. Fig 6.)

HAB. Northern and Middle Islands: Auckland and Port Preservation, *Lyall.*

Viridis vel pallide fuscus. *Caulis* sesquipollicaris, repens. *Folia* arcte imbricata, apice sinu obtuso obliquo bidentata, dentibus brevibus spinosis, e cellulis majusculis interstitiis angustis areolata. *Amphigastria* parva, spinoso-quadridentata. *Perianthium* breviter campanulatum, superne paullulum coarctatum, ore ciliis paucis brevibus dentato. *Odor* pungens, piperaceus.

In size and general appearance not unlike *Lophocolea bidentata*, but its leaves are much more closely imbricated and of a different texture; in the last particular it has the closest affinity with *C. aculeatus*, *C. Lyallii*, and *C. trispinosus*.—PLATE XCVIII. Fig. 6 :—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, a portion of the leaf with cells :—*both magnified.*

10. Chiloscyphus *coalitus*, Nees, *G. L. et N. Syn. Hep. p.* 180 *et* 706. *Flor. Antarct. p.* 157. C. oblongifolius, *Hook. fil. et Tayl., ex parte.*

HAB. Northern and Middle Islands: Dusky Bay, *Menzies.* Wairarapa Valley, *Colenso.* Port Preservation, *Lyall.* Bay of Islands, *J. D. H.* Hokianga, *Joliffe.*

11. Chiloscyphus *physanthus*, Mitten; caule repente ramoso, foliis imbricatis ovatis apice spinoso-bidentatis cum amphigastriis spinoso-quadridentatis utrinque anguste coalitis, perianthio campanulato ore laciniis dentatis incurvis, foliis involucralibus quadridentatis, amphigastrio ovato bidentato.—Lophocolea physantha, *Hook. fil. et Tayl., Lond. Journ. Bot.* 1844, *p.* 561. *G. L. et N. Syn. Hep. p.* 700. (TAB. XCVIII. Fig. 7.)

HAB. Northern Island: Bay of Islands, *J. D. H.*

Viridis, dein fuscescens. *Caulis* uncialis. *Folia* dentibus divergentibus, sinu obtuso. *Amphigastria* profunde bifida, basin versus extus utrinque uni- rarius bidentata, basi anguste in folia subjecta decurrentia. *Perianthium* superne subplicatum. *Capsula* elliptica.

As in *C. chlorophyllus*, the habit of this species is more like that of the lesser species of *Lophocolea* with bidentate leaves; but the form and position of the perianth are altogether those of *Chiloscyphus.* The laciniæ at the mouth of the perianth are strongly dentate, but not ciliate, nor is the resemblance to *Lophocolea multipenna*, which Dr. Taylor notices, very marked.—PLATE XCVIII. Fig. 7 :—1, a plant, *natural size*: 2, a portion of the stem with leaves and stipule; 3, a perianth with capsule and involucral leaves :—*both magnified.*

12. Chiloscyphus *combinatus*, Nees, *G. L. et N. Syn. Hep. p.* 182.

HAB. Northern Island: amongst Mosses, Wellington, *Stephenson.* Bay of Islands, *Cunningham* (*Herb. Mitten*). Cape Turnagain, etc., *Colenso.*

13. Chiloscyphus *echinellus*, Mitten.—Lophocolea echinella, *G. L. et N. Syn. Hep. p.* 703.

HAB. Northern and Middle Islands: Dusky Bay, on *Plagiochila ramosissima* (*Herb. Ldbg. et Gottsche*). Auckland, amongst *Chiloscyphus odoratus* and *C. fissistipus*, *Sinclair.*

Perianthium breviter campanulatum, ore trilabiato dentato.

A small species, allied in size and in its papillate leaves to *Lophocolea muricata*, but with the campanulate lateral perianth of *Chiloscyphus.*

14. Chiloscyphus *sinuosus*, Nees, *G. L. et N. Syn. Hep. p.* 175 *et* 705. *Flor. Antarct. p.* 157. Chiloscyphus oblongifolius, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1845, *p.* 563, *ex parte.* *Hook. Musc. Exot. t.* 113.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies.* Bay of Islands, *J. D. H.*

Also found in Lord Auckland's Group.

15. Chiloscyphus *piperitus*, Mitten; caule repente vage ramoso, foliis oblongis ovatisve apice sinu rotundato bidentatis, dentibus brevibus spinosisve, amphigastriis bidentatis. (TAB. XCVIII. Fig. 8.)

HAB. New Zealand, *Herb. Mitten.*

Pallide fuscus. *Caulis* semipollicaris. *Folia* antice conniventia, cellulis hexagonis. *Amphigastria* caule paulo latiora, segmentis lanceolatis divergentibus. *Spicæ masculæ* parvæ, elongatæ, squamis imbricatis bidentatis. *Odor Piperis nigri.*

A small plant, with considerable resemblance to *Geocalyx graveolens*, Schrad., but with differently-shaped leaves. The presence of male spikes, arising from the sides of the stems, is a character of no great generic value, for it has been observed in *Lophocolea* and *Chiloscyphus*, although, in both these genera, it is decidedly exceptional.—PLATE XCVIII. Fig. 8:—1, a plant, *natural size;* 2, a portion of the stem, with leaves and male spike; 3, portion of the stem with stipule; 4, portion of male spike, with leaflet detached; 5, portion of leaf with cells:—*all magnified.*

16. Chiloscyphus *laxus,* Mitten; caule repente subsimplici, foliis remotiusculis ovato-oblongis apice varie tri-quadridentatis, amphigastriis parvis profunde bipartitis segmentis extus unidentatis. (TAB. XCIX. Fig. 1.)

HAB. Northern and Middle Islands: Auckland, *Sinclair;* creeping over *Gottschea appendiculata, Lyall.*

Amœne viridis, subpellucidus. *Caulis* elongatus, bipollicaris, parce ramosus, fragillimus. *Folia* explanata, plerumque inæqualiter quadridentata, e cellulis majusculis laxis areolata. *Amphigastria* quadrispinosa.

The remarkably lax texture of the leaves of this species gives it more resemblance to some forms of *Calypogeia Trichomanis*, than to any *Chiloscyphus*. *Female flowers*, in a very young state, have been observed on short and thick lateral branches.—PLATE XCIX. Fig. 1:—1, plants, *natural size;* 2, a portion of the stem with leaves, *magnified.*

17. Chiloscyphus *supinus,* Hook. fil. et Tayl.; caule repente vage ramoso, foliis ovatis apice obtusis rarius bidentatis margine dorsali arcuato ventrali subrecto, amphigastriis ambitu suborbicularibus spinoso-dentatis, medio sinu rotundo bidentatis, basi utrinque cum foliis subjectis anguste coalitis, "perianthio campanulato ore flexuoso-laciniato."—*Lond. Journ. Bot.* 1846, *p.* 284. *G. L. et N. Syn. Hep. p.* 708. (TAB. XCIX. Fig. 2.)

HAB. Northern Island: Bay of Islands, *Sinclair*. Ruahine range, *Colenso.*

Fusco-virens. *Caulis* sesquipollicaris. *Folia* imbricata, explanata, subtruncata, undulata, margine dorsali apicem versus paullulo recurvo, in ramis junioribus folia abnormalia varie bidentata, tenera, cellulis hexagonis. *Amphigastria* majuscula, lateribus 5–6-spinosis. "Folia involucralia fere perianthii longitudine, alterum majus 3–4-fidum, alterum minus bifidum. Amphigastrium involucrale brevius." *Tayl.*

This species resembles *C. polycladus*, and agrees with it in having the dorsal margins of its leaves arcuate, whilst the ventral are almost straight from the base to the apex, and at right angles from the stem; the occasional bidentation of the leaves seems similar to that which may be sometimes observed in the European *C. pallescens*. Dr. Taylor has described the perianth, which resembles that of allied species.—PLATE XCIX. Fig. 2:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipule, *magnified.*

18. Chiloscyphus *polycladus,* Mitten; caule repente ramoso, foliis explanatis ovatis obtusis margine dorsali arcuato integerrimo, ventrali rectiusculo basin versus dentibus parvis armato, amphigastriis circiter sexspinosis utrinque cum foliis subjectis anguste coalitis.—Lophocolea polyclada, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1846, *p.* 367. *G. L. et N. Syn. Hep. p.* 697. (TAB. XCIX. Fig. 3.)

HAB. Middle Island: Akaroa, *Raoul.*

Pallide fuscus. *Caulis* bi-tripollicaris. *Folia* laxe imbricata, margine ventrali basin versus sub-3-dentato, dorsali apicem versus subrecurvo, tenera, cellulis rotundatis interstitiis angustis. *Amphigastria* varia, pleraque sexspinosa. *Flores fœminei* in ramulo juvenili brevissimo laterales.

A species with some resemblance to the European *C. pallescens*, Nees, but differing in texture and the form of the leaves from it and all other species, including *Lophocolea planiuscula*, to which it has been compared.—PLATE

XCIX. Fig. 3:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipule; 3, a portion of leaf with cells:—*both magnified.*

Gen. VI. PSILOCLADA, *Mitten.*

Perianthium in ramulo brevissimo laterale, subcylindricum, læve, ore laciniato-dentato. *Involucri* folia magna.—Folia *succuba, minuta, quadridentata.* Amphigastria *foliis conformia.* Caulis *ramulis alternis subpinnatim ramosus, procumbens.*

1. Psiloclada *clandestina,* Mitten.—Jungermannia clandestina, *Wils. in Herb. Mitten.* (Tab. XCIX. Fig. 4.)

Hab. Northern Island: amongst Mosses, Wellington, *Stephenson;* a single stem.

Caulis exilis, pollicaris, procumbens vel adscendens, subpinnatim ramosus. *Folia* explanata, minuta, remota, subquadrata, ad medium quadrifida, segmentis aculeiformibus basi extus cellulis tumidis tuberculatis, a basi patula, abrupte inflexis, rigidula, e cellulis grossis interstitiis crassiusculis areolata, segmenta foliorum cellulis nullis. *Amphigastria* paullo minora, fere conformia. *Folia* involucralia majora et teneriora, secunda, profunde bifida, laciniis falcatis subulato-attenuatis dentatis. *Perianthium* subcylindricum, læve, laciniis subulato-attenuatis secundis.

The habit of this plant is so unlike that of any described genus with succubous leaves, that I have been obliged to consider it as the type of a new one, bearing somewhat the same relation to *Chiloscyphus,* that *Lepidozia* does to *Mastigobryum.* In general appearance, this minute species resembles *Lepidozia capillaris,* Sw., but from its shorter and inflexed leaves, looks smaller, and might easily be passed over as an imperfect state of that or an allied species. It differs from *Lepidozia* in the absence of flagella, in its succubous leaves, and in the very much increased size of those of the involucrum. Some latitude must be allowed for the above description, which is drawn up from a few fragments picked out of Tasmanian Mosses by Mr. Wilson, a single New Zealand specimen, and one entire empty perianth.—Plate XCIX. Fig. 4:—1, a plant, *natural size;* 2, a portion of the stem with leaves; 3, a leaf; 4, a stipule detached from the stem; 5, a perianth with involucral leaves and a portion of the stem:—*all magnified.*

Gen. VII. GYMNANTHE, *Tayl.*

1. Gymnanthe *saccata,* Taylor, *Flor. Antarct. p.* 153. *G. L. et N. Syn. Hep. p.* 193 *et* 712. Jungermannia saccata, *Hook. Musc. Exot. t.* 16.

Hab. Throughout the Islands: Dusky Bay, *Menzies.* Bay of Islands, *J. D. H.* Poverty Bay, Lake Taupo, etc., *Colenso.* Chalky Bay and Southern Island, *Lyall.*

An Auckland Island species.—The name proposed for this genus is scarcely expressive of the remarkable structure of its fructification. The archegonia appear to be produced on the dorsal side of the apex of the stem, and the torus is formed by the downward expansion of the ventral side. In *G. saccata* the unfertilized archegonia are themselves drawn into the mouth of the torus, and at maturity remain enclosed there, in appearance at the summit of the calyptra, which is everywhere connate with the torus itself. The leaves on the dorsal side and at the apex remain, at the completion of the growth of the torus, in the same position as before. The chief peculiarity of these plants is the apparent dorsal formation of the archegonia, which, when fertilized, sink through the stem to form the perianths. In the smaller species with entire leaves, this structure gradually becomes less apparent, and in *G. lutescens* [*Gymnomitrium,* Gottsche, Syn. Hep. p. 4] there is scarcely any formation of torus, but the fruit rises from the dorsal side and incrassated apex of the stem, surrounded by the upper leaves, concrete more or less with the calyptra. The same structure is observable in *G. Wilsoni.* The absence of stipules ascribed to the genus by Dr. Taylor, is invalidated as a generic character by *G. lutescens* and some other species to be mentioned hereafter.

2. Gymnanthe *tenella,* Hook. fil. et Tayl., *Lond. Journ. Bot.* 1844, *p.* 377. *G. L. et N. Syn. Hep. p.* 192 *et* 712.

Hab. Northern Island: Port Nicholson, *Lyall.*

Also an Auckland Island species, referred in Fl. Antarct. to the preceding.

3. Gymnanthe *setulosa,* Mitten; caule procumbente, ramis erectis setulis brevibus dense obtectis, foliis bifariis oblongis obovatis ovatisve bilobis apiculatis margine dorsali medium versus sinuato-lobato denticulato ventrali varie dentato. (Tab. XCIX. Fig. 5.)

Hab. Northern Island: Tararua Mountains, with *Plagiochila falcata, Colenso.*

Luteo-virens. *Caulis* repens, radiculosus. *Rami* erecti, pollicares. *Folia* lobis obtusiusculis, lobo dorsali interdum incurvo, marginibus undulatis sinuatis et denticulatis.

A very distinct little species, with the habit of *G. saccata* and *G. Urvilleana,* but readily distinguished by its densely setulose stems; its leaves, like those of the species just named, are notched just below the apex, so as to give the leaves a somewhat bilobate appearance.—Plate XCIX. Fig. 5:—1, plants, *natural size;* 2, a portion of the stem with leaves; 3, portion of leaf with cells:—*both magnified.*

4. Gymnanthe *Urvilleana,* Tayl., *Lond. Journ. Bot.* 1844, *p.* 468. *G. L. et N. Syn. Hep. p.* 193 *et* 712. *Flor. Antarct. p.* 153 *et* 435. Scapania, *Mont. Voy. au Pôle Sud, t.* 16. *f.* 2.

Hab. Northern Island: Auckland, *Col. Bolton.* Ravines, Wairarapa Valley, etc., *Colenso.*

Also a native of Lord Auckland's Group, Fuegia, and Tasmania.

5. Gymnanthe *unguiculata,* Mitten; caule repente adscendente creberrime radiculoso, foliis imbricatis suborbiculatis quadratisve inæqualiter sinuato-bilobis lobo dorsali minore bi-tri-spinosis ventrali subquadridentatis, amphigastriis minutis palmatis bifidisve spinoso-dentatis. (Tab. XCIX. Fig. 6.)

Hab. Northern Island: creeping over a *Dicranum,* Sulphur springs, Waimate, *Colenso.*

Pallide viridis, fusca vel purpureo-tincta. *Caulis* radiculis crebris albidis repens. *Folia* antice conniventia, suprema sensim majora, hinc apex caulis abruptus videtur. *Amphigastria* (facillime prætervisa) polymorpha, bi-trifida v. palmata.

This curious little plant has the size, habit, and general appearance of the European *Jungermannia capitata,* Hook.; the texture of the leaves is also very similar. It agrees with *G. Wilsoni,* which is its nearest ally, in its unequally bilobate leaves.—Plate XCIX. Fig. 6:—1, plants, *natural size;* 2, a stem with leaves; 3, a portion of the stem with leaf; 4, a portion of the stem with stipules:—*all magnified.*

6. Gymnanthe *lophocoleoides,* Mitten; caule repente radiculoso, foliis obovatis cuneatisve sinu profundo lato rotundato subulato-bidentatis. (Tab. XCIX. Fig. 7.)

Hab. Northern Island: creeping amongst *Plagiochila falcata,* Tararua mountains, *Colenso.*

Luteo-viridis, pallescens. *Caulis* sesquipollicaris, procumbens, radiculis ex angulis ventralibus foliorum orientibus. *Folia* explanata, marginibus paullulo recurvis, convexiuscula, lobo ventrali aliquantulo majore, e cellulis rotundatis interstitiis grossiusculis areolata. *Amphigastria* nulla.

A small species, which might, perhaps, have been referred to *Jungermannia,* but its appearance, areolation, and the absence of stipules, seem to place it in the present genus. In its size it nearly resembles *Lophocolea diademata.*—Plate XCIX. Fig. 7:—1, a plant, *natural size;* 2, a portion of the stem with leaves, *magnified.*

7. Gymnanthe *Drummondii,* Mitten; caule repente prostrato crassiusculo, foliis ovatis obtusis explanatis integerrimis, toro genitali longissimo angusto clavato radiculoso.—Riccia squamata, *Tayl. in Drummond's Swan River Mosses.* Podanthe squamata, *Tayl. Lond. Journ. Bot.* 1846, *p.* 413. *G. L. et N. Syn. Hep. p.* 789. ? Jungermannia pansa, *Tayl. Lond. Journ. Bot.* 1846, *p.* 275. *G. L. et N. Syn. Hep. p.* 676. (Tab. XCIX. Fig. 8.)

Hab. Northern Island: forests of Titiokura, *Colenso.*

Fusco-viridis. *Caules* semipollicares, arcte repentes vel interdum arcuati, apicibus radicantibus. *Folia* explanata, imbricata, ovata, margine dorsali subrecurvo, superne sensim majora. *Torus* longissimus, longitudine plantam totam æquans, anguste claviformis, radiculis parvis obtectus.

An interesting little species, allied to *G. Bustillosii*, Mont., from Peru, but readily distinguished from all others yet known, by its very long torus. The New Zealand specimens are rather smaller than those from Swan River, but correspond in all other respects; and a reference to the figure will show that it cannot be referred to *Riccia*.—PLATE XCIX. Fig. 8:—1, plants, *natural size;* 2, a plant entire; 3, a portion of the stem with leaves:—*both magnified.*

Gen. VIII. SACCOGYNA, *Dumort.*

1. Saccogyna *australis*, Mitten; caule repente ramoso, foliis imbricatis ovatis apice obtusis minute bidentatis integerrimisve, amphigastriis parvis bidentatis basi in folia subjecta anguste decurrentibus, perianthiis carnosis radiculosis. (TAB. C. Fig. 1.)

HAB. Northern Island: forests, Tararua, *Colenso.*

Sordide flavo-viridis. *Folia* explanata, margine dorsali subrecurvo. *Amphigastria* fere ad basin bipartita, segmentis ovato-lanceolatis, cauli parallelis. *Perianthium* 2 lin. longum, ore foliolis tribus dentatis coronato. *Calyptra* perianthio omnino adnata.

Closely resembling the British *S. viticulosa* in size, habit, colour, and the minutely punctulate surfaces of its leaves, but differing in its bipartite stipules and minutely bidentate and narrower leaves, the cells of which are nearly twice the size of those of the European plant. The internal structure of the perigynium, or torus, differs from that of *S. viticulosa* in having the calyptra adnate with it throughout. There is no involucellum surrounding the base of the fruit-stalk in this species, nor does there appear to be any such part present in the torus of *Gymnanthe saccata;* what seems to have been mistaken for it is only the slightly expanded base of the fruit-stalk at its point of union with the bottom of the torus.—So few examples of the perfect torus of *Saccogyna viticulosa* have been examined, that it appears premature to deny the presence of an involucellum in that plant; it is stated in the 'Synopsis Hepaticarum' nearly to equal the height of the combined part of the calyptra.—PLATE C. Fig. 1:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipule; 3, portion of the leaf with cells; 4, a portion of the stem and section of the torus with part of the fruit-stalk:—*all magnified.*

Gen. IX. LEPIDOZIA, *G. L. et N.*

1. Lepidozia *microphylla*, Lind., *G. L. et N. Syn. Hep. p.* 202. *Ldbg. et G. Sp. Hep. Lepidozia, p.* 16. *t.* 2. Jungermannia microphylla, *Hook. Musc. Exot. t.* 80.

HAB. Middle Island: Dusky Bay, *Menzies.* Port Preservation, *Lyall.*

2. Lepidozia *capilligera*, Lind., *G. L. et N. Syn. Hep. p.* 204. *Ldbg. et G. Sp. Hep. Lepidozia, p.* 25. *t.* 4. L. tetrapila, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1846, *p.* 370. *G. L. et N. l. c. p.* 716.

HAB. Northern Island: Tararua, with *Saccogyna australis, Colenso.*

3. Lepidozia *prænitens*, Lehm. et Lind., *G. L. et N. Syn. Hep. p.* 206. *Ldbg. et G. Sp. Hep. Lepidozia, p.* 33. *t.* 6.

HAB. Northern and Middle Islands: Dusky Bay, probably gathered by *Menzies* [*Herb. Lehm. et Lind.*]. Ravines near Wellington, with *Leucobryum brachyphyllum, Stephenson* [*Herb. Mitten*]. Water-courses, Tararua, *Colenso.*

This species was mixed with the *P. dispar* and *P. patentissima* from Lord Auckland's Islands.

4. Lepidozia *Gottscheana*, Lind., *G. L. et N. Syn. Hep. p.* 206. *Ldbg. et G. Sp. Hep. Lepidozia, p.* 35. *t.* 6.

HAB. Middle Island: Dusky Bay, *Menzies.*

5. Lepidozia *lævifolia,* Tayl., *Flor. Antarct. p.* 157. *G. L. et N. Syn. Hep. p.* 208. *Ldbg. et G. Sp. Hep. Lepidozia, p.* 47. *t.* 7 *bona.*

HAB. Northern Island: [*Herb. Taylor et Gottsche*]. Wellington, *Stephenson* [*Herb. Mitten*]. Port Nicholson, *Lyall.* Tehawera, *Colenso.*

Also found in Lord Auckland's Group and Campbell's Island.

6. Lepidozia *pendulina,* Lind., *G. L. et N. Syn. Hep. p.* 208. Lepidozia, *Ldbg. et G. Sp. Hep. p.* 49. *t.* 7. Jungermannia pendulina, *Hook. Musc. Exot. t.* 60.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies.* Top of Ruahine range, *Colenso.*

7. Lepidozia *spinosissima,* Mitten; caule laxe cæspitoso lævi bipinnato, surculis sursum confertis attenuato-flagelliferis, foliis amphigastriisque erecto-patentibus e lata subquadrata basi quadripartitis, segmentis setaceis rigidis integerrimis.—Sendtnera spinosissima, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1846, *p.* 373. *G. L. et N. Syn. Hep. p.* 723. (TAB. C. Fig. 2.)

HAB. Northern Island: Auckland, etc., *Edgerley, Sinclair, Jolliffe, Colenso.*

Pallide fusca. *Rami* tripollicares, ramulis ramosis superne fastigiatis. *Folia* profunde quadrifida, segmentis anguste lanceolatis, marginibus integerrimis. *Amphigastria* conformia.

This tall species is easily recognized by its deeply-cleft leaves and stipules, which being rather distant, the stems have a different look from most others of the genus, and more nearly resemble *Sendtnera ochroleuca,* Nees. No perianths have been seen, but very young involucra are present on some of the stems.—PLATE C. Fig. 2:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipules, *magnified.*

8. Lepidozia *capillaris* [Swartz], Lind., *G. L. et N. Syn. Hep. p.* 212. Lepidozia, *Ldbg. et G. Sp. Hep.* Jungermannia capillaris, *Swartz, Fl. Ind. Occid. v.* 3. *p.* 1856. J. hippuroides, *Hook. fil. et Tayl., Flor. Antarct. p.* 159. *t.* 65. *f.* 7. J. nemoides, *Lond. Journ. Bot.* 1845, *p.* 84. *G. L. et N. Syn. Hep. p.* 717.

HAB. Northern Island: amongst *Chiloscyphus supinus,* Bay of Islands, *Sinclair.*

None of the plants here referred to *L. capillaris* present any appreciable differences from an original specimen of that plant from Swartz, preserved in Herb. Hooker.

9. Lepidozia *Lindenbergii,* Gottsche, *G. L. et N. Syn. Hep. p.* 213. Lepidozia, *Ldbg. et G. Sp. Hep. p.* 66. *t.* 11. L. tetradactyla, *Hook. fil. et Tayl., Flor. Antarct. p.* 158, quoad specim. e Nova Zelandia.

HAB. Northern Island: amongst *L. prænitens* [*Herb. Lehmann*], growing with *L. lævifolia,* in ravines near Wellington, *Stephenson.* Forests, Manawatu and Tehawera, *Colenso.* Bay of Islands, *J. D. H.*

It appears that this is the *L. tetradactyla* of Dr. Taylor, so far as relates to the New Zealand specimens, but is not the plant described under that name from Lord Auckland's Island and Hermite Island, which is *L. plumulosa,* Lehm. et Ldbg., a species not yet seen from New Zealand. In the 'Species Hepaticarum' (*Lepidozia*) of Lindenberg and Gottsche, a full description of this and the preceding species is given, and reference is made to figures which, as in the case of *L. dispar,* Mont., have apparently not been published.

Gen. X. MASTIGOBRYUM, *G. L. et N.*

1. Mastigobryum *anisostomum,* Lehm. et Ldbg., *G. L. et N. Syn. Hep. p.* 219 *et* 717. M. atrovirens, *Tayl. Lond. Journ. Bot.* 1844, *p.* 338. *Flor. Antarct. p.* 160. *G. L. et N. Syn. Hep. p.* 218.

HAB. Middle Island: Dusky Bay, *Menzies* [*Herb. Lehmann*]; growing amongst *Chiloscyphus decipiens,* Port Preservation, *Lyall.*

The New Zealand specimens of this species differ a little in habit from those from Lord Auckland's Islands, on account of the latter having grown in closely-matted patches.

2. Mastigobryum *Colensoanum,* Mitten; caule procumbente dichotomo-prolifero stolonifero, foliis imbricatis oblongis sinu acuto subinæqualiter bidentatis, amphigastriis parvis obtuse tricrenatis. (TAB. C. Fig. 3.)

HAB. Northern Island: growing amongst *Saccogyna australis,* Tararua, *Colenso.*

Pallide viride, tenellum. *Caulis* pollicaris. *Folia* explanata, oblonga, margine dorsali parum arcuato, ventrali rectiusculo, apice bidentato, dente ventrali aliquantulo minore, e cellulis majusculis lævibus areolata. *Amphigastria* saule paulo angustiora, appressa.

A small species, readily distinguished from all its congeners by its nearly equally bidentate leaves, which have the lesser tooth on the ventral side, and not, as occurs in *M. anisostomum* and the other bidentate-leaved species, on the dorsal, nor are the leaves papillose.—PLATE C. Fig. 3:—1, a plant, *natural size;* 2, a portion of the stem, with leaves and stipule; 3, portion of leaf with cells:—*both magnified.*

3. Mastigobryum *convexum,* Lind., *G. L. et N. Syn. Hep. p.* 215. Jungermannia convexa, *Thunb., Prodr. Fl. Cap. p.* 173.

HAB. Northern Island: growing amongst *Jungermannia monodon,* Tararua mountains, *Colenso.*

This small species has been sent from Australia by Mr. Bidwill, and is stated to grow in Peru; there is however a very closely-allied species, to which the Peruvian specimens may possibly belong*. *M. tenacifolium* (Hook. fil. et Tayl.), *Jungermannia tenacifolia,* Flor. Antarct. tab. lxiv. fig. 4, belongs either to this group of the genus, or to that with an oblique notch at the apices of the leaves; it was gathered at Cape Horn, mixed with *J. madida,* and in Lord Auckland's Islands.

4. Mastigobryum *affine,* Mitten; caule repente ramoso stolonifero, foliis imbricatis oblique ovatis apice oblique truncatis et obtuse tridentatis, amphigastriis transverse oblongis apice spinoso-pluridentatis basi utrinque cum foliis conjunctis. (TAB. C. Fig. 4.)

HAB. Northern Island: with *M. convexum,* amongst *Jungermannia monodon,* Tararua and Tehawera mountains, *Colenso.*

Fusco-viride. *Caulis* pollicaris, dichotome ramosus. *Folia* arcte imbricata, margine dorsali arcuato, ventrali subrecto, apice oblique truncata tridenticulata.

Very nearly allied to *M. integrum,* Nees et Mont., a species found in Mauritius, but differing in its spinoso-dentate stipules, and obliquely truncate leaves.—PLATE C. Fig. 4:—1, plants, *natural size;* 2, a portion of the stem with leaves and stipules; 3, portion of leaf with cells:—*both magnified.*

5. Mastigobryum *Taylorianum,* Mitten; caule repente subramoso, foliis laxe imbricatis tridentatis oblique ovatis margine dorsali parum arcuato ventrali subrecto basi medio cellulis elongatis majoribus vittatis, amphigastriis rotundo-quadratis acute quadridentatis.—M. monilinerve, *Tayl. in Herb. Hook.* (*non Lehm. et Lind.*) (TAB. C. Fig. 5.)

HAB. Northern Island: forests, Tehawera, etc., *Colenso.*

Viride. *Caulis* gracilis, eflagellaris? *Folia* explanata, acute dentata. *Vitta* e seriebus cellularum formata, ante apicem evanescens.

* *M. Richardianum,* Mitten; caule repente ramoso, foliis imbricatis oblique ovatis linea cellularum elongatarum vittatis apice obtusis rotundatis minute tridenticulatis margine dorsali arcuato ventrali recto, amphigastriis parvis subquadratis acute quadridentatis.

HAB. Ad Fretum Magellanicum (*Herb. Richard*).

M. convexo affine; differt, foliis magis ovatis, patentibus, margine ventrali rectiore, et amphigastriis quadridentatis non quadrilaciniatis.

A small species, with much of the habit and appearance of *M. monilinerve*, but in size nearer to *M. convexum*; from the first it differs in the form of its leaves and stipules, and from the last in its narrower and acutely-toothed leaves.—PLATE C. Fig. 5:—1, a stem, *natural size*; 2, a portion of the same with leaves and stipules; 3, portion of leaf with cells:—*both magnified.*

6. Mastigobryum *monilinerve*, Nees, *G. L. et N. Syn. Hep. p.* 223. Jungermannia monilinervis, *Lehm. et Lind. in Lehm. Pug. pl.* 4. *p.* 56.

HAB. Southern Island: growing on *Plagiochila annotina*, *Lyall.*

7. Mastigobryum *Novæ-Hollandiæ*, Nees, *Flor. Antarct. p.* 159. *G. L. et N. Syn. Hep. p.* 221 *et* 717.

HAB. Northern and Middle Islands: on decayed wood, Hawke's Bay, *Colenso.* Port William, Port Preservation, etc., *Lyall.*

A Lord Auckland's Group and Tasmanian plant. All the New Zealand specimens have the apices of their leaves, as well as the teeth themselves, minutely denticulate, and ought therefore to be considered as the *var.* γ of the 'Synopsis Hepaticarum.' In Dr. Greville's specimens, referred in the 'Synopsis' to the *var.* α, with the teeth and apices of the leaves entire, these parts are certainly denticulate.

8. Mastigobryum *Novæ-Zelandiæ*, Mitten; caule procumbente dichotomo, foliis imbricatis oblique ovatis divergentibus apice tridentatis margine dorsali arcuato ventrali sinuato, amphigastriis quadratis patentibus apice crenulatis basi utrinque cum foliis conjunctis. (TAB. C. Fig. 6.)

HAB. Northern Island: forests, Tehawera and Tararua, growing with *Saccogyna australis*, *Colenso.*

Fusco-viride. *Caulis* bi-tripollicaris, flagellifer. *Folia* deflexa, subopposita, integerrima.

In size and habit allied to the European *M. trilobatum*, but in the united bases of its stipules and leaves, to *M. Novæ-Hollandiæ*; differing however from this last, as well as from *M. involutum*, in its quadrate stipules.—PLATE C. Fig. 6:—1, a plant, *natural size*; 2, a portion of the stem with leaves and stipule; 3, portion of leaf with cells:—*both magnified.*

9. Mastigobryum *involutum*, Lind., *Hook. fil. et Tayl. Flor. Antarct. p.* 159. *G. L. et N. Syn. Hep. p.* 220 *et* 717. Herpetium involutum, *Mont. Voy. au Pôle Sud, t.* 18. *f.* 2.

HAB. Middle Island: Milford Sound, *Lyall.*

Also found in Lord Auckland's Group.

Gen. XI. MICROPTERYGIUM, *G. L. et N.*

1. Micropterygium *nutans*, Mitten.—Jungermannia (Mastigobryum) nutans, *Flor. Antarct. p.* 160. *t.* 65. *f.* 8. *G. L. et N. Syn. Hep. p.* 219 *et* 717.

HAB. Northern Island: forests of Titiokura, *Colenso.*

Also a native of Lord Auckland's Group. The habit is so nearly that of the other species of the present genus that it has been thought advisable to remove it from *Mastigobryum*, notwithstanding that the leaves want the keel along their under surfaces and are bifid at their apices. At first sight the leaves appear carinate from the transparency of the larger cells near their bases. The perianths are large, lanceolate, and trigonous above; they appear to spring from the stem just at the angles of the leaves and stipules.

Gen. XII. ISOTACHIS, *Mitten.*

Perianthium terminale, tubulosum, ore contracto, dentato. *Caulis* erectus, innovationibus ramosus.—Folia *incuba, amphigastriaque fere conformia, conduplicata, sæpe serrulata.*

The above appears to be all that may be safely affirmed of this genus. It is readily recognized by its evenly arranged leaves and stipules, which last so nearly resemble the leaves in size and form, that the foliage might almost be called trifarious. The perfect capsule has been seen only in two species, in one of which it is spirally twisted, and in the other perfectly even and straight. This genus is distinguished from *Jungermannia* by its incubous leaves, and from *Sendtnera*, which it closely resembles in habit, by the form of its perianth and free calyptra.

1. Isotachis *Lyallii,* Mitten; caule erecto ramoso apicibus decurvis, foliis imbricatis subquadratis vel semicordatis truncatis margine dorsali valde arcuato apicem versus denticulato ventrali rectiusculo incurvo spinuloso-dentato apice quadrifido sinu medio profundiore laciniis marginibus recurvis dentatis incurvis, amphigastriis inferne cauli adpressis superne patulis obovatis tri-quadrifidis denticulatis basin versus dentibus elongatis deflexis armatis, perianthio elongato subcylindrico minute tuberculato apice obtuso, foliis amphigastrioque involucralibus internis minutissimis externis majoribus marginibus dorsalibus magis dentatis.—(Tab. C. Fig. 7.)

Hab. Northern and Middle Islands: Port Preservation, *Lyall.* Top of Ruahine mountains, *Colenso.*

Pallida, inferne fusca, superne purpureo-tincta. *Caulis* tripollicaris, basi decumbens, ramis parum ramosis. *Folia* secunda, subopposita, dorso arcte imbricata. *Perianthium* tubulosum, elongatum, basi apiceque rotundatum, carnosum, rigidum. *Folia involucralia* minuta, exteriora caulinis similia, sed duplo majora.

A large and handsome species, remarkable for its dirty-white colour, and for the decurved apices of its stems, which are tinged of a purplish or violet. It is closely allied to *I. madida* and to *I. Gunniana* (a Tasmanian species not yet described) in the structure of its perianth, which, unlike any other *Jungermannia,* is composed of several layers of cells; this thickening of its walls is not owing to the adhesion of the calyptra within, nor to leaves on the external surface. The inner involucral leaves in all these species are very minute and liable to be overlooked.—Plate C. Fig. 7:—1, a plant, *natural size;* 2, a leaf; 3, portion of leaf with cells; 4, a stipule; 5, a perianth and involucral leaves:—*all magnified.*

2. Isotachis *subtrifida,* Mitten; caule erecto subsimplici apice decurvo, foliis secundis ovatis conduplicatis apice bi-trifidis dentibus margineque dorsali integerrimis ventrali vel integerrimo vel parce dentato, amphigastriis conformibus aliquantulo minoribus.—*Hook. fil. et Tayl. Lond. Journ. Bot.* 1844, *p.* 579. *G. L. et N. Syn. Hep. p.* 681.

Hab. Northern Island: Bay of Islands, amongst *Lophocolea leucophylla, J. D. H.*

Pallide fusca, apicibus pallide roseis. *Caulis* pollicaris, gracilis. *Folia* laxe imbricata, erecto-patentia, sinubus laciniisque acutiusculis, margine dorsali integerrimo, ventrali nonnunquam parce dentato et basi dente parvo auriculari decurvo.

A small and slender species, more nearly allied to one gathered in Peru by Professor Jameson than to any of those yet described, and, so far as can be seen from the very rudimentary state of its involucral leaves, corresponding in its involucrum and perianth. It has less the look of *J. serrulata,* Sw., than many of the allied species, from its leaves being more erect. The New Zealand specimens strikingly resemble young stems of the tropical form of *Sendtnera juniperina* (Sw.), Nees.

Gen. XIII. GOTTSCHEA, *Nees ab E.*

1. Gottschea *pinnatifolia,* Nees. *G. L. et N. Syn. Hep. p.* 22 *et* 625. *Flor. Antarct. p.* 147. *t.* 63. *f.* 1. G. ciliigera, *Lond. Journ. Bot. t.* 3. *p.* 147. Jungermannia pinnatifolia, *Hook. Musc. Exot. t.* 114.

Hab. Northern and Middle Islands: Dusky Bay, *Menzies.* Tararua mountains, *Colenso.* Port William, *Lyall.*

Also found in Lord Auckland's Group.

2. Gottschea *tuloides*, Hook. fil. et Tayl.; caule disperso procumbente abbreviato subramoso, foliis imbricatis patentibus apice dentatis, lobo ventrali ovato-lanceolato acuto, dorsali breviore ovato apice truncato, margine anteriore recurvo.—*Lond. Journ. Bot.* 1844, *p.* 558. *G. L. et N. Syn. Hep. p.* 626. (TAB. CI. Fig. 1.)

HAB. Northern and Middle Islands: forests, East Coast, *Colenso*. On the bark of trees, Port Preservation, *Lyall*.

Plantæ in cæspitibus Muscorum etc. repentes. *Caules* pollicares, pallidissime virides. *Folia* imbricata, lobus dorsalis ventrali dimidio brevior, apice truncatus et dentatus; ventralis concavus, margine plano, apice dentatus, et cum apice lobi dorsalis punctis elevatis notatus. *Folia* involucralia libera, amplectentia. *Capsula* parva, oblonga, brevipedicellata.

This small species is readily distinguished from all its allies by the absence of stipules and the presence of small raised points towards the extremities of the lobes of its leaves.—PLATE CI. Fig. 1:—1, plants, *natural size;* 2, a leaf; 3, involucrum and uppermost leaf upon it:—*both magnified.*

3. Gottschea *appendiculata*, Nees. *G. L. et N. Syn. Hep. p.* 14. Jungermannia appendiculata, *Hook. Musc. Exot. t.* 15.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies*. Port Cooper, *Lyall*. Auckland, *Sinclair, etc.* Hokianga, *Joliffe*.

The perfect involucrum of this fine species is formed by the union of the margins of the uppermost leaves and stipule when present; towards its base it is overlaid with several pairs of leaves, which are also united: this structure seems to be due to the growing up of the outer wall of the stem itself, after the fertilization of the archegonium, or pistil. The calyptra, which is the enlarged base of the archegonium, is itself attached to the inner surfaces of the leaves, and, as in *Symphogyna* and *Steetzia*, it bears on its summit all the sterile archegonia. The structure therefore of the involucrum of *Gottschea* differs scarcely at all from that of *Polyotus* and *Sendtnera; Trichocolea* differs from *Sendtnera* more in appearance than in characters, for its involucrum is formed in exactly the same manner. That this must be the true explanation of the apparently perforate stem, seems proved by the archegonia, when perfect, being borne on the axis of the stem; and it is not until after fertilization that the sterile ones are carried up by the combined growth of the leaves and calyptra: this explanation appears as natural as that which makes the pedicel descend into the axis of the stem to produce an involucrum. In the 'Synopsis Hepaticarum,' *Gottschea* is regarded as forming a peculiar tribe (*Cœlocaules*), from the nature of its involucre, which has been sufficiently commented upon above; but the incubous insertion of its leaves seems not to have been apprehended by the authors of that valuable work.

4. Gottschea *splachnophylla*, Hook. fil. et Tayl., *Flor. Antarct. p.* 424. *t.* 156. *f.* 2. *G. L. et N. Syn. Hep. p.* 621.

HAB. Northern Island: summit of Ruahine mountains.

This species was first found at Cape Horn. The figure of the leaves is not accurate in Flor. Antarct.; they are made out with great difficulty if the specimens are not in a good state, on account of their very fragile and fleshy texture. The true form of the leaf is to have ventral lobes ovate-oblong, its apex truncate, entire; the dorsal, broadly ovate or semicordate, shorter than the ventral lobe and with its apex also truncate; the dorsal lobe is so placed upon the ventral as to leave a broad portion of the latter free below it to the base. In the younger stems the leaves vary considerably, and are found with the ventral lobe ovate acute, the dorsal also ovate, with one or two obtuse teeth; the free portion, below the line of union of the two lobes, is also wider. The stipules in the larger plants are somewhat of a semi-orbicular form, their apices retuse; in the smaller plants they are oblong and bifid. The stems, when prostrate, as the larger usually are, are thickly covered with radicles, which completely hide the stipules and stem itself, but there are no "squamæ," as stated by Dr. Taylor. It is probable that this species is

nearly allied to *G. pachyphylla*, of which no specimens have been seen.—*Gottschea pachyla*, Crypt. Antarct. t. 156. f. 2, is a species of entirely different habit, and in this particular approaches those *Jungermanniæ* which are allied to *J. serrulata*.

5. Gottschea *nobilis*, Nees. *G. L. et N. Syn. Hep. p.* 21 *et* 624. Jungermannia nobilis, *Hook. Musc. Exot. t.* 11.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies*. Dead wood at Tararua, *Colenso*. South end of the Middle Island, *Lyall*.

The figure in 'Musci Exotici' well represents the general appearance of this plant; but the leaves, which are similar to those of *G. Lehmanniana* and *G. Blumei*, are represented as bifid and complicate, the dorsal lobe being combined with the ventral about one-third of its width from its lower margin, having its own lower margin often free and resembling a keel along the combined lobes. This is caused in all the genus by the adhesion of the lobes just above their lower margins, so as to form a single complicate leaf above, when the two free margins below form a sort of double keel.

6. Gottschea *ciliata*, Mitten; ramis adscendentibus parum ramosis, foliis imbricatis lobis ovatis subæqualibus ciliato-spinulosis, amphigastriis bifidis vel quadrifidis spinoso-ciliatis. (TAB. CI. Fig. 4.)

HAB. Northern Island: on *Hymenophyllum*, Ruahine mountains, *Colenso*.

Pallida. *Rami* simplices, rarius ramosi. *Amphigastria* sinubus laciniisque rotundatis, toto margine dentibus varie directis ciliatis.

A species with much of the habit and appearance of *G. pinnatifolia*, but very distinct from it, and all other described species, in the nearly equal lobes of its leaves, which, with the stipules, are so closely set with ciliiform teeth, as to give the ventral side of the stems a woolly appearance.—PLATE CI. Fig. 4:—1, a plant, *natural size*; 2, 3, stipules; 4, leaves as seen on both sides:—*all magnified.*

7. Gottschea *glaucescens*, Nees. *G. L. et N. Syn. Hep. p.* 20 *et* 624. Jungermannia glaucescens, *Hook. Musc. Exot. t.* 39.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies*. Port William and Port Preservation, *Lyall*. Dense forests, Wairarapa, *Colenso*.

A very distinct and curious species, which is said to grow on the Neilgherry mountains.

8. Gottschea *Lehmanniana*, Lind. *in Lehm. Pug. v.* 4. *p.* 60. *G. L. et N. Syn. Hep. p.* 20 *et* 623. *Flor. Antarct. p.* 146. G. Hombroniana, *Mont. in Voy. au Pôle Sud, t.* 16. *f.* 1.

HAB. New Zealand, *Herb. Funck. et Nees, ex Herb. Banks*. Middle Island: Chalky Bay, *Lyall*.

A native of Tasmania, New Holland, and Lord Auckland's Islands.

9. Gottschea *Balfouriana*, Hook. fil. et Tayl., *Lond. Journ. Bot.* 1844, *p.* 356. *Flor. Antarct. p.* 147. *G. L. et N. Syn. Hep. p.* 622. (TAB. CI. Fig. 2.)

HAB. Northern and Middle Islands, *Colenso*. Chalky Bay, *Lyall*.

More nearly allied to *G. Lehmanniana* than to *G. Blumei*; for though the dorsal lobe of the leaf is truncate as in the latter, the habit and appearance are altogether that of the former. The phyllidia are very variable: besides being lanceolate, some are variously divided into narrow laciniæ.—PLATE CI. Fig. 2:—1, a plant, *natural size*; 2, a stipule; 3, a phyllidium; 4, leaves as seen on both sides of the stems:—*all magnified.*

10. Gottschea *unguicularis*, Hook. fil. et Tayl.; ramis adscendentibus subsimplicibus, foliis imbricatis patentibus lobo ventrali elongato-elliptico basin versus dentibus elongatis paucis armato superne lamellis parvis cristato apice obtuso dentato dorsali late ovato truncato dentato, amphigastriis quadrifidis segmentis varie dentato-ciliatis, foliolis accessoriis parvis subremotis, involucro elongato foliis laxe obtecto, capsula oblongo-cylindrica.—*Lond. Journ. Bot.* 1844, *p.* 558. *G. L. et N. Syn. Hep. p.* 622. (TAB. CII. Fig. 1.)

Hab. Northern Island, *Colenso.* Auckland, *Dr. Sinclair and Col. Bolton.*

Pallide viridis. *Rami* pollicares, parum ramosi, inferne radicellis purpureis vestiti. *Foliola* accessoria ab angulis decurrentibus foliorum et amphigastriorum orta. *Folia* involucralia non vaginantia, supremo magis dentato-ciliato.

The smallest of the New Zealand species, allied to *G. Balfouriana*, but differing in its much less dentato-ciliate leaves and stipules.—Plate CII. Fig. 1:—1, plants, *natural size;* 2, a portion of the stem with leaf, stipule, and accessory leaflets, as seen on the ventral side; 3, a leaf as seen on the dorsal side:—*both magnified.*

11. Gottschea *repleta*, Hook. fil. et Tayl.; caule erecto glabro cæspitoso ramoso, foliis imbricatis erecto-patentibus amplexicaulibus, lobo ventrali late ovato-lanceolato subacuto subtus apicem versus tricristato cristis subintegerrimis dorsali foliigeno late ovato uniplicato utroque dentato, amphigastriis imbricatis oblongis bifidis segmentis bilaciniatis ciliatis.—*G. L. et N. Syn. Hep. p.* 622. Jungermannia repleta, *Tayl. Lond. Journ. Bot.* 1844, *p.* 357. (Tab. CI. Fig. 3.)

Hab. Northern and Middle Islands, *Colenso.* Port William, *Lyall.*

Luteo-viridis. *Rami* adscendentes, 1–2-pollicares, inferne radicellis purpureis obsiti. *Folia* laxe imbricata, marginibus pinnatifidis cristisque dentatis. *Amphigastria* magna, profunde bipartita, laciniis sinuatis dentatis.

A larger plant than *G. Balfouriana*, with more pointed leaves, and a stem destitute of phyllidia. In habit it resembles *G. Lehmanniana* and *G. Blumei.*—Plate CI. Fig. 3:—1, 2, plants, *natural size;* 2, a stipule; 4, leaves as seen on both sides:—*both magnified.*

Gen. XIV. POLYOTUS, *Gottsche.*

1. Polyotus *clavigerus*, Gotts. *G. L. et N. Syn. Hep. p.* 245. *Hook. Musc. Exot. t.* 70. *Flor. Antarct. p.* 163.

Var. *α;* foliis omnibus integerrimis.

Var. *β. Stangeri;* foliis ramulorum dentato-serratis.

Var. *γ. Taylori;* foliis caulinis margine ventrali basin versus dentato-spinosis.—P. Taylori, *G. L. et N. Syn. Hep. p.* 246.

Hab. Northern and Middle Islands. Var. *α.* Dusky Bay, *Menzies.* Var. *β.* Auckland, *Sinclair, Stanger* (*Herb. Gourlie*). Var. *γ.* Dusky Bay, *Menzies.* Milford Sound and Bligh's Sound, *Lyall.* Live trees, Wairarapa forest, *Colenso.*

A Campbell's Island plant.—After a careful examination, *P. Taylori*, Gottsche, has been referred to a denticulate state of *P. clavigera*, which was originally described with entire leaves. The stipules, like the leaves, are very variable in their toothing, which is sometimes extended to the dorsal margin of the latter. Only one specimen has been seen, which corresponds in every respect with the figure in 'Musci Exotici,' though many others have leaves for the most part entire.

2. Polyotus *palpebrifolius*, Gotts. *G. L. et N. Syn. Hep. p.* 246. *Hook. Musc. Exot. t.* 71. *Flor. Antarct. p.* 443.

Hab. Middle Island: Dusky Bay, *Menzies.* Thomson's Sound, *Lyall.*

Also found in the Straits of Magellan.

3. Polyotus *brachycladus*, Gotts. *G. L. et N. Syn. Hep. p.* 247.

Hab. Northern Island: summit of Ruahine mountains, *Colenso.*

The specimens of this very distinct species, although poor and imperfect, possess more resemblance to *P. clavigera* in habit, than the original specimens from Tasmania, in Dr. Greville's Herbarium.

4. Polyotus *Magellanicus*, Gotts. *G. L. et N. Syn. Hep. p.* 248. *Lamarck, Encycl. Bot. v.* 3. *p.* 284. *Hook. Musc. Exot. t.* 115. *Flor. Antarct. p.* 162 *et* 443.

HAB. Northern and Middle Islands: forests, head of Wairarapa river, *Colenso*. Chalky Bay, *Lyall*.

Also found in Campbell's Island, Tasmania, Australia, and Fuegia.

Gen. XV. SENDTNERA, *Endlicher*.

1. Sendtnera *juniperina*, Nees. *G. L. et N. Syn. Hep. p.* 230.

HAB. Northern Island: a single stem, with *Jungermannia colorata*, top of Ruahine range, *Colenso*.

The New Zealand specimen of this widely diffused (but not Antarctic) species, although of a pale brown colour, appears to belong to that form which has been brought from the Sandwich Islands, and noticed in the 'Synopsis Hepaticarum' as δ *sanguinea;* and is intermediate in size and appearance between the European and tropical forms.

2. Sendtnera *ochroleuca*, Nees. *G. L. et N. Syn. Hep. p.* 240 *et* 722. Mastigophora hirsuta, *Nees. Flor. Antarct. p.* 160 *et* 443.

HAB. Middle Island: Milford Sound and Port Preservation, *Lyall*.

Also found in Campbell's Island, Fuegia, Mexico, Java, and South Africa.

3. Sendtnera *Scolopendra*, Nees. *G. L. et N. Syn. Hep. p.* 241 *et* 723. *Flor. Antarct. p.* 160. Jungermannia Scolopendra, *Hook. Musc. Exot. t.* 40. Schisma Scolopendra, *Nees et Auct.*

HAB. Middle Island: Dusky Bay, *Menzies*.

Found as far south as Campbell's Island.

4. Sendtnera *attenuata*, Mitten; ramis adscendentibus, ramulis attenuatis divaricatis pinnatim ramosis, foliis imbricatis basi ovatis ad medium bifidis segmentis bipartitis laciniis lanceolatis margine ventrali integerrimo dorsali spinoso-dentato, amphigastriis conformibus profundius fissis marginibusque basi denticulatis, involucro ovato foliolis ramentisque vestito. (TAB. CII. Fig. 2.)

HAB. Northern Island: Bay of Islands, *J. D. H.*

Pallide fusca. *Rami* tripollicares, simplices vel rarius ramosi. *Ramuli* flexuosi, flagelliformes, attenuati, parum ramosi. *Folia* cauli appressa. *Amphigastria* basi denticulis calcariformibus decurvis aucta. *Involucrum* e foliis amphigastriisque supremis calyptro coadunatis compositum. *Capsula* orbicularis, brevipedicellata.

Closely allied to *S. ochroleuca* in habit and appearance, but differing in the ovate bases of its leaves, which are cleft only to the middle, and are dentate on the dorsal margin; the laciniæ too are less spreading. The involucrum in this species is formed, as in *Gottschea*, by the adhesion of the upper leaves to the calyptra.—PLATE CII. Fig. 2: —1, a male and female plant, *natural size;* 2, a leaf; 3, a stipule; 4, an involucrum entire; 5, a section of the involucrum, showing the capsule within, and the barren pistils on the top of the calyptra:—*all magnified.*

5. Sendtnera *flagellifera*, Nees. *G. L. et N. Syn. Hep. p.* 242. Jungermannia flagellifera, *Hook. Musc. Exot. t.* 59.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies*. *Fagus* forests, *Colenso*. Port Preservation, *Lyall*. Bay of Islands, *A. Cunningham, etc.* Hokianga, *Jolliffe*.

Gen. XVI. TRICHOCOLEA, *Dumort.*

1. Trichocolea *tomentella*, Nees. var. γ. *Javanica;* caule laxo irregulariter bi-tripinnato, ramis terminalibus divaricatis.—*G. L. et N. Syn. Hep. p.* 237. T. mollissima, *Flor. Antarct. p.* 161.

HAB. Throughout the Islands; abundant in damp woods.

This is found in Lord Auckland's Group, and as far south as Campbell's Island.

2. Trichicolea *lanata*, Nees. *G. L. et N. Syn. Hep. p.* 238. *Hook. Musc. Exot. t.* 186.

Hab. Throughout the Islands, abundant, *Menzies, etc.*

No collector seems to have met with the fruit of this species since Menzies.

Gen. XVII. RADULA, *Nees.*

1. Radula *buccinifera,* Hook. fil. et Tayl.; caule implexo prostrato ramoso, ramis patentibus, foliis subimbricatis patentibus integerrimis lobo superiore obovato-rotundato convexiusculo inferiore minuto trapezoideo adpresso, perianthio demum axillari ex angusta basi obconico subcompresso truncato.—*Lond. Journ. Bot.* 1844, *p.* 580. *G. L. et N. Syn. Hep. p.* 261.

Hab. Northern Island: Tararua mountains, and *Fagus* forests, Manawatu, etc., *Colenso.* Amongst Mosses and Lichens, near Wellington, *Stephenson.* Port Nicholson, *Lyall.*

Luteo-viridis, fuscescens. *Caulis* pollicaris, pinnatim ramosus. *Folia* laxe imbricata, apice rotundata, lobulo subquadrato, apice cauli incurvo. *Perianthium* longissimum, subcylindricum, superne compressum, ore ampliato integerrimo.

Very closely resembling *R. Novæ-Hollandiæ,* Hampe, but differing in its obtuse leaves, which are more minutely areolate, and in the sinuate upper margin of the lobule, whence its apex is curved round towards the stem. It is a much smaller species than *R. complanata.* A specimen of *R. Novæ-Hollandiæ,* communicated by Dr. Lehmann, consists partly of the species described under that name, with acute leaves, and partly of *R. buccinifera,* to which last probably belong all the obtuse obovate-leaved specimens attributed in the description to *R. Novæ-Hollandiæ.*

2. Radula *physoloba,* Mont., *in Voy. au Pôle Sud, Bot. Crypt. t.* 17. *f.* 4. *Flor. Antarct. p.* 162.

Hab. Northern Islands: forests at Manawatu river, *Colenso.*

3. Radula *uvifera,* Hook. fil. et Tayl., *Lond. Journ. Bot.* 1844, *p.* 392. *Flor. Antarct. p.* 162. *G. L. et N. Syn. Hep. p.* 258 *et* 729. R. multicarinata, *Ldbg. l. c. p.* 258?

Hab. Northern Island: near Wellington, *Stephenson* (*Herb. Mitten*). Ruahine mountains, Wairarapa Valley, Cook's Straits, etc., *Colenso.*

Also a native of Lord Auckland's Group. The description of *R. multicarinata,* Ldbg., applies so well to this species, that there seems but little doubt of its identity. It is a remarkably neat plant, and it agrees in its numerous slender male spikes with *R. formosa,* Nees.

4. Radula *plicata,* Mitten; caule gracili procumbente pinnatim ramoso, foliis obovato-rotundis lobulo oblongo quadruplo minore angulo acuto, perianthio elongato lineari applanato subseptemplicato.

Hab. Northern Island: creeping over a fern with *R. buccinata,* Auckland, *Sinclair.*

Caulis pollicaris, gracilis. *Folia* imbricata, rotundata, lobulo oblongo parum ventricoso, angulo recto. *Perianthium* angustum, a basi ad apicem dorso bi- ventre tri-carinatum, ore truncato, labiis integerrimis.

So closely allied to *R. buccinata* in size and general appearance, as to be easily passed over for that species; but an examination of its perianths at once shows it to be allied to *R. multicarinata* alone, which is however a much larger plant, with differently shaped leaves and a more numerously and finely plicate perianth.

5. Radula *complanata,* Dumort. *G. L. et N. Syn. Hep. p.* 257. *Flor. Antarct. p.* 161.

Hab. Northern Island: trunks of *Alectryon* at Raukawa, *Colenso.* (A native of England.)

A native of Europe, and also found in Campbell's Island. A small state, without fruit, and bearing gemmæ on the edge of its leaves, as in common British forms.

6. Radula *marginata,* Hook. fil. et Tayl.; caule implexo procumbente complanato vage ramoso, foliis distichis subimbricatis patentibus lobo superiori oblongo-rotundato integerrimo marginato inferiori ovato-

lanceolato obtuso, perianthio terminali elongato cylindraceo compresso bilabiato labiis subtruncatis integerrimis.—*Lond. Journ. Bot.* 1844, *p.* 566. *G. L. et N. Syn. Hep. p.* 261.

Hab. Northern Island: Bay of Islands, *J. D. H.*

Sordide luteo-viridis. *Caulis* pollicaris, ramosus. *Folia* laxe imbricata, e cellulis minutissimis rotundatis remotis areolata, margine incrassato subcorneo fusca. *Lobulus* oblique ovatus, fere erectus, cauli appressus. *Perianthium* compressum, inferne angustatum, utroque latere marginatum.

Easily distinguished from all its congeners by the thickened margin of its leaves, which is most evident in the dry state. Dr. Taylor states the stems to be three inches long; in our specimens they are about one inch long, and agree nearly in size and habit with *R. complanata.*

Gen. XVIII. MADOTHECA, *Dumort.*

1. Madotheca *Stangeri,* Ldbg. et G. *G. L. et N. Syn. Hep. p.* 280 *et* 735. M. elegantula, *Mont. Voy. au Pôle Sud, t.* 18. *f.* 3. *Flor. Antarct. p.* 163. M. partita, *Tayl. G. L. et N. Syn. Hep. p.* 279.

Hab. Abundant throughout the Islands, *Menzies,* etc.

Found as far south as Lord Auckland's Group. The differences in appearance of the varieties of this species are great, but when a sufficient number of specimens are examined, they will be found gradually passing into each other. The largest state has branches nearly a foot in length, and with the central parts of its stipules bossed outwards, forming an umbo, which is completely lost in the common states.

Gen. XIX. LEJEUNIA, *Gottsche et Lindenberg.*

1. Lejeunia *Stephensoniana,* Mitten; caule dichotome ramoso, foliis imbricatis oblongo-ovatis acutis integerrimis margine ventrali incurvis et basi in lobulum parvum dentatum abeunte, amphigastriis obovatis subtruncatis denticulatis. (Tab. CII. Fig. 3.)

Hab. Northern Island: a fragment picked from Mosses gathered in ravines near Wellington by *Mr. W. Stephenson* (*Hb. Mitten*).

Olivacea, sesquipollicaris. *Folia* vel explanata vel apicibus incurvis et involutis. *Amphigastria* crenato-denticulata, lateribus paullulo recurvis.

In size and appearance this closely resembles *L. scutellata;* in its denticulate stipules it is more nearly allied to *L. spatulistipa,* Nees, and *L. comosa,* Ldbg., species from Java and Penang; but its more remote leaves give the branches a different appearance. The genera *Thysananthus, Phragmicoma, Omphalanthus,* and at least the smaller species of *Ptychanthus,* are here considered *Lejeuniæ,* for the characters upon which they have been separated are those which both in *Lejeunia* and *Frullania* are subject to wide variation: thus *F. cylindrica* is as much entitled to generic distinction as *Omphalanthus,* for the smoothness or plication of the perianth in *Frullania* (which it seems impossible to break up into smaller natural genera) has a corresponding series in *Lejeunia* understood as above; indeed there appears nothing but the greater size of the plants to keep *Bryopteris* and the larger species of *Ptychanthus* from falling into *Lejeunia.*—Plate CII. Fig. 3:—1, a stem, *natural size;* 2, a portion of the same with leaves and stipule:—*both magnified.*

2. Lejeunia *scutellata,* Mitten; caule cæspitoso adscendente dichotomo, surculis erectis, foliis imbricatis subpatentibus convexis oblongis integerrimis apice recurvis basi sinuato-complicatis lobulis rotundis involutis, amphigastriis subimbricatis rotundatis, perianthio axillari oblongo angulis integerrimis, foliis involucralibus immersis subintegerrimis ovato-lanceolatis lobulis lanceolatis, amphigastriis floralibus elongato-obovatis emarginato-bifidis.—Thysananthus scutellatus, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1846, *p.* 383. *G. L. et N. Syn. Hep. p.* 739. (Tab. CII. Fig. 4.)

Hab. Northern Island: Bay of Islands, *A. Cunningham, etc.*

Olivacea, fusco-viridis. *Caulis* pollicaris, bipollicarisve. *Folia* imbricata, oblonga-ovata, acuta, apicibus decurvis, lobulo parvo integerrimo e cellulis laxiusculis areolata. *Amphigastria* orbiculari-obovata, integerrima. "*Involucrum* pallidum, inter perianthii basin et primum par foliorum caulinum omnino latens, dimidiam perianthii altitudinem non attinget; folia involucralia acuta, lobulis acuminatis."—*Tayl.*

Very closely resembling *L. Stephensoniana* and *L. bicolor*, Mont. [*Phragmicoma bicolor*, Nees], a common South American species; it also resembles *L. anguiformis*, but this last is a smaller plant, with more julaceous branches. The fruit has not been observed on Dr. Sinclair's specmens, which alone have been examined.—Plate CII. Fig. 4:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipule, *magnified.*

3. Lejeunia *anguiformis*, Hook. fil. et Tayl.; caule simplici vel subpinnatim ramoso, foliis oblongo-ovatis integerrimis apice acuto obtusove totoque margine ventrali incurvo lobulo transverse elongato apice rotundato integerrimo, amphigastriis suborbiculatis integerrimis, perianthio obovato compresso superne lateribus denticulatis dorso tri- ventre quadri-plicato, foliis involucralibus latioribus lobulis acutis, amphigastrio obovato integerrimo.—Spisananthus anguiformis, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1844, *p.* 567. *G. L. et N. Syn. Hep. p.* 289. (Tab. CII. Fig. 5.)

Hab. Northern Island: trees, Tararua, etc., *Colenso.*

Fusco-viridis. *Caulis* 1–1½-pollicaris, simplex vel interdum pinnatim ramosus. *Folia* patentia, imbricata, lobulo angusto truncato a basi ad medium marginis ventralis protracto. *Amphigastria* latiora quam longa. *Perianthium* obovatum, apiculatum, marginibus denticulatis plicis variis, sæpius superne dorso plicis tribus obtusiusculis, ventre carinis parvis duabus intermedioque vel rotundato obtuso vel etiam leviter bicarinato.

Intermediate in size between *L. corticalis*, L. et L. [Phragmicoma], and *L. bicolor*, Mont. [Phragmicoma], both South American species; it is, however, readily distinguished from its near allies by the form of its lobule, and the denticulation of its perianth.—Plate CII. Fig. 5:—1, stems, *natural size;* 2, a portion of the same with leaves and stipules; 3, a perianth, with involucral leaves, as seen on the ventral side; 4, a transverse section of the upper part of the perianth:—*all magnified.*

4. Lejeunia *plicatiscypha*, G. L. et N.; caule cæspitoso adscendente subramoso, foliis imbricatis patentibus oblongis obtusiusculis apice recurvis, lobulis anguste ovatis acutis involutis, amphigastriis rotundatis integerrimis, perianthio terminali immerso obcordato tetragono angulis alatis dentatis tubo minuto coronato.—*G. L. et N. Syn. Hep. p.* 748. Phragmicoma plicatiscypha, *Hook. fil. et Tayl. in Lond. Journ. Bot.* 1846, *p.* 386.

Hab. Northern Island: Bay of Islands, *Sinclair.*

There are no specimens of this plant in Herb. Hook.

5. Lejeunia *mollis*, Mitten; caule subdisperso repente vage subpinnato, foliis imbricatis patentibus rotundato-ovatis obtusis integerrimis basi sinuato-plicatis, lobulo subquadrato basi involuto apice adpresso, amphigastriis minoribus rotundatis integerrimis, perianthio laterali obovato sursum 8–10-plicato tubifero.—Ptychanthus mollis, *Hook. fil. et Tayl. in Lond. Journ. Bot.* 1846, *p.* 384. *G. L. et N. Syn. Hep. p.* 739.

Hab. Northern Island: Bay of Islands, amongst Lichens, *J. D. H.*

No specimens of this species are in Herb. Hook.

6. Lejeunia *ophiocephala*, Mitten; caule subcæspitoso procumbente compresso parce ramoso per intervalla coarctato, foliis convexis arcte imbricatis patentibus oblongis integerrimis apice rotundatis recurvis basi sinuato-complicatis, lobulis majoribus ovatis involutis extus unidentatis, amphigastriis laxe imbricatis tenuissimis rotundis integerrimis apice recurvis, perigoniis terminalibus ovalibus.—Thysananthus ophiocephalus, *Tayl. in Lond. Journ. Bot.* 1846, *p.* 384. *G. L. et N. Syn. Hep. p.* 739.

HAB. Northern Island: Bay of Islands, *Sinclair.*

No specimens of this are now in British Herbaria. The species, from the descriptions, seem to be very nearly allied to *L. anguiformis; L. mollis* also, excepting as regards the large cells attributed to its leaves, corresponds very well with that species.

7. Lejeunia *olivacea,* Hook. fil. et Tayl.; caule implexo procumbente vage subpinnatim ramoso, foliis imbricatis patentibus oblongo-ovatis apice rotundatis incurvis lobulo parvo ovato basi inflato integerrimo apice acuto, amphigastriis orbiculari-obovatis, perianthio oblongo-obovato compresso dorso ventreque tricarinato, foliis involucralibus angustioribus acutis, amphigastrio ovato bidentato.—*Lond. Journ. Bot.* 1844, *p.* 568. *G. L. et N. Syn. Hep. p.* 334. (TAB. CIII. Fig. 1.)

HAB. Northern Island: near Wellington, *Stephenson, Colenso.*

Fusca. *Caulis* pollicaris, vage ramosus. *Folia* sicca rugulosa, apicibus incurvis marginibusque sæpe decoloratis albidis, lobulo tumido. *Perianthium* dorso carinis obtusis ventre acutioribus præditum.

Nearly allied to *L. scutellata* in size, habit, and colour, but readily distinguished by its obtuse leaves, and by its lobule being carried further along the ventral margin, and being unidentate. It more nearly resembles the European *L. Mackaii* than any other species.—PLATE CIII. Fig. 1:—1, stems, *natural size;* 2, a portion with the leaves and stipules; 3, a perianth, with involucral leaves and stipule, as seen on the ventral side; 4, a transverse section of the upper part of the perianth:—*all magnified.*

8. Lejeunia *pulchella,* Mitten; caule repente cæspituloso, foliis remotiusculis flexuosis ellipticis obtusis integerrimis lobulo parvo subquadrato bidentulo, amphigastriis nullis, perianthio laterali applanato obconico retuso-emarginato marginibus integerrimis, foliis involucralibus minoribus angustioribus. (TAB. CIII. Fig. 2.)

HAB. Northern Island: creeping over *Hymenophyllum,* Manawatu river, *Colenso.*

Albida. *Caulis* linearis bilinearisve, pulvinatus. *Folia* tenera, incurva, recurva et varie modo flexuosa. *Perianthium* superne obcordatum, compressum, integerrimum.

A most distinct little species, with something of the habit and look of the West Indian and Brazilian *L. pellucida,* Meisner. It appears to grow in small loose pulveruli.—PLATE CIII. Fig. 2:—1, plants, *natural size,* as seen growing on the stipes of *Hymenophyllum;* 2, a portion of the stem with leaves; 3, a portion of the stem with a perianth, as seen on the ventral side:—*both magnified.*

9. Lejeunia *lævigata,* Mitten; caule repente et cum foliis arctissime applanato lævissimo vage pinnatim ramoso, foliis suborbicularibus obtusissimis lobulo oblongo apice tridentato, amphigastriis nullis, perianthio obconico turbinatove dorso depresso lævi ventre bicarinato, foliis involucralibus angustioribus lobis obtusis integerrimis.

HAB. Northern Island: Auckland, closely creeping over the fronds of a *Trichomanes, Sinclair.* On leaves, with *Metzgeria furcata,* Tehawera, *Colenso.*

Caulis fere pollicaris, linearis, vage ramosus, arctissime applanato-repens, lævigatus. *Folia* imbricata, subrotunda, lobulo oblongo obovatove quadruplo minore. *Perianthium* obtusum, dorso planum, ventre plicis parvis appressis bicarinatum.

Allied to *L. pulchella,* and, like it, destitute of stipules, but perfectly distinct in the form of its leaves and perianth.

10. Lejeunia *tumida,* Mitten; caule repente ramoso, foliis ovatis apice rotundatis patentibus lobulo subinflato apice inflexo, amphigastriis orbiculatis bifidis laciniis acutis, perianthio oblongo-obovato tumido apice parum retuso inferne cylindrico lævi superne obtusissime pentagono, foliis involucralibus lobulo longiore obtuso, amphigastrio lanceolato bifido. (TAB. CIII. Fig. 3.)

Hab. Northern Island: on trees, Auckland, *Sinclair.* Amongst Mosses, in ravines near Wellington, *Stephenson.* Tehawera, etc., *Colenso.*

Pallide viridis. *Caulis* trilinearis, repens. *Folia* laxe imbricata, pellucide areolata. *Amphigastria* laciniis paulo divergentibus. *Perianthium* inflatum, superne obtusum, fere læve.

Nearly resembling *L. thymifolia* and *L. serpyllifolia,* but rather smaller, and with smaller cells. It is also nearly allied to the Peruvian *L. cyathophora,* Mitten, particularly in its smooth inflated perianths. This species has been gathered in Campbell's Island, and in Australia, by Mr. Bidwill, whose specimens, although apparently belonging to the same species, have more elongated and divergent leaves: it stains the paper in the same manner as *L. serpyllifolia.*—Plate CIII. Fig. 3:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipule; 3, a perianth, with involucral leaves and stipule, as seen on the ventral side; 4, a transverse section of the upper part of the perianth:—*all magnified.*

11. Lejeunia *thymifolia,* Nees. *G. L. et N. Syn. Hep. p.* 373.

Hab. Northern Island: on live trees, Bay of Islands, *Sinclair.* Cape Turnagain, etc., *Colenso.*

Some of the specimens here referred to this species were named by Dr. Taylor *L. serpyllifolia,* from which, however, they are decidedly distinct in the form of the perianth.

12. Lejeunia *nudipes,* Hook. fil. et Tayl.; caule repente dichotome ramoso, foliis obovatis basi attenuatis apice rotundatis obtusissimis lobulo parvo angusto unidentato, amphigastriis ovatis bifidis laciniis acutis, perianthio clavato superne pentagono retuso angulis cellulis majusculis prominentibus crenulatis, foliis involucralibus conformibus lobulis ovatis amphigastrio obovato bifido segmentis ovatis.—*Lond. Journ. Bot.* 1844, *p.* 568. *G. L. et N. Syn. Hep. p.* 372. (Tab. CIII. Fig. 4.)

Hab. Northern Island: Bay of Islands, creeping on Mosses, *J. D. H.*

Pallide viridis. *Caulis* bilinearis. *Folia* remota, cellulis paullulo majoribus marginata, subcrenulata, e cellulis subopacis areolata. *Amphigastria* parva, remota. *Perianthium* basi longiuscule attenuatum, substipitatum.

A curious little species, readily distinguished by its obovate leaves, and clavate perianths, which appear naked at their bases, owing to the form of the involucral leaves, which the perianth itself does not much exceed in length. The perianth is not alate, nor are the leaves acute, as described by Dr. Taylor.—Plate CIII. Fig. 4:—1, a plant, *natural size;* 2, a portion of the stem with leaves and stipule; 3, a perianth with involucral leaves and stipule, as seen on the ventral side; 4, a transverse section of the upper part of the perianth:—*all magnified.*

13. Lejeunia *implexicaulis,* Hook. fil. et Tayl., *Flor. Antarct. p.* 165. *G. L. et N. Syn. Hep. p.* 376. L. Mimosa *et* L. albovirens, *Hook. fil. et Tayl. l. c. p.* 166. *t.* 66. *f.* 4. *G. L. et. N. Syn. Hep. p.* 377 *et* 387.

Hab. Northern Island: amongst Mosses, Wellington, *Stephenson.* Manawatu River, *Colenso.*

Also found in Lord Auckland's Group and Campbell's Island. I do not recognize any character whereby to distinguish the two species I have included under this. The *L. albovirens* is a rather smaller state than the others, but the areolation has a peculiar grumous appearance, which renders the species more easily recognizable than many others of these small plants. In the most perfect forms the apices of the leaves are incurved, and are either acute or obtusely angled; but in the smaller states (like the *L. albovirens*) this apiculus is wanting. The perianth is compressed, with one carina on the dorsal side, and two on the ventral.

14. Lejeunia *papillata,* Mitten; caule repente vage ramoso, foliis oblique ovatis obtusis dorso marginibusque papillis elongato-conicis asperrimis lobulo parvo rotundato inflato, amphigastriis parvis rotundatis bifidis, laciniis extus uni-bi-denticulatis, perianthio oblongo apice retuso basi attenuato superne subcompresso pentagono angulis papillosis, foliis involucralibus minoribus lobulo ovato, amphigastrio obovato breviter marginato. (Tab. CIII. Fig. 5.)

Hab. Northern Island: on *Hypnum hispidum,* in ravines near Wellington, *Stephenson;* on *Trichomanes elongatum, Sinclair;* on fronds of *Hymenophyllum* with *Saccogyna australis, Colenso.*

Pallide viridis. *Caulis* bilinearis. *Folia* remotiuscula, deflexa, margine dorsali convexo, ventrali subrecto, apicem versus angustato inflexo. *Amphigastria* lævia. *Perianthium* medio subconstrictum, parcius papillosum, angulis superne acutioribus.

A curious little plant, about the size of *L. serpyllifolia*, but in the form of its papillose leaves more nearly allied to the South American *L. denticulata*. There are, however, several apparently undescribed species, to which the present is closely allied.—PLATE CIII. Fig. 5:—1, plants, *natural size*, on a portion of the frond of *Trichomanes elongatum*; 2, a portion of the stem with leaves and stipule; 3, a perianth with involucral leaves and stipule; 4, a transverse section of the perianth in its upper part:—*all magnified.*

15. Lejeunia *latitans*, Hook. fil. et Tayl., *Flor. Antarct. p.* 54. *G. L. et N. Syn. Hep. p.* 345.

HAB. Northern Island: moist banks in the interior, *Colenso.*

A minute species, also found in Lord Auckland's Island: it resembles *L. hamatifolia*, but the margins of its leaves are entire. The involucral leaves and obovate stipule are united at, and for a short distance above, their bases, a circumstance which occurs in some other allied species, as in the European *L. calcarea.*

16. Lejeunia *dentata*, Mitten; foliis ambitu subrotundis apice inæqualiter bidentatis sinu obtuso margine dorsali tridentatis ventrali integerrimis, lobulo majusculo ovato oblongo obtusiusculo integerrimo, amphigastriis nullis.

HAB. Adhering to a Moss from New Zealand (*Mr. Sowerby in Herb. Mitten*).

The fragment from which this very distinct species has been described is but two or three lines long, and the plant appears to be rather smaller than *L. tumida*; it is readily distinguished from all other New Zealand species by the broad teeth of its leaves.

17. Lejeunia *comitans*, Hook. fil. et Tayl.; caule implexo procumbente vage subramoso, surculis sursum incrassatis, foliis imbricatis tumidis patentibus oblongis acutiusculis apice recurvis integerrimis, lobulis ovatis inflexis subunidentatis, amphigastriis minutis incontiguis rotundatis bifidis, perianthio axillari subexserto obcordato triquetro.—*Lond. Journ. Bot.* 1846, *p.* 400. *G. L. et N. Syn. Hep. p.* 760.

HAB. Northern Island: Bay of Islands, with *L. mollis* among Lichens, *J. D. H.*

Pallide olivacea. *Caules* vix bilineares. *Folia* minute areolata, arcte imbricata. *Perianthium* dorso complanatum, ventre late unicarinatum.

This species is not now in British Herbaria.

Gen. XX. FRULLANIA, *Raddi.*

1. Frullania *patula*, Mitten; caule pinnatim ramoso, foliis laxe imbricatis orbiculatis integerrimis erectopatulis margine ventrali basi late inflexo in auricula galeata subcompressa decurva transeunte, amphigastriis magnis cordato-orbiculatis brevissime bifidis, perianthio obovato apiculato lævissimo, foliis involucralibus elongatis ovatis obtusis basi ventricosis perianthium arcte amplectentibus. (TAB. CIV. Fig. 1.)

HAB. Northern Island: dead bark, Tarawera, *Colenso.* Fences, Manawatu River, etc.

Olivaceus, fuscescens. *Caulis* pollicaris, pinnatim ramosus. *Folia* remotiuscula, dorso cauli adpressa, planiuscula, auricula parva galeata decurva. *Amphigastria* folia subæquantia. *Folia* involucralia basi maxime ventricosa, dimidium perianthii arcte obtegens. *Amphigastrium* involucrale oblongum, parvum, apice lacerum. *Perianthium* pro planta parvum, ubique lævissimum.

A species with considerable resemblance to the South American *F. arietina*, Taylor, but with less closely imbricated leaves, which too are patent, so that one-third of the leaf remains on the opposite side of the stem when viewed from beneath. The curious perianth of this species at first sight appears to be concrete with the in-

volucral leaves, and looks far more like a naked calyptra, than a perianth, such as is usually met with in this large genus.—PLATE CIV. Fig. 1:—1, stems, *natural size;* 2, a portion of the same with leaves and stipule:—*magnified.*

2. Frullania *squarrosula*, Hook. fil. et Tayl.; caule procumbente bipinnatim ramoso, foliis ovatis apice rotundatis patenti-recurvis squarrosulis auriculis galeæformibus cucullatisve compressis, amphigastriis rotundato-ovatis bifidis, perianthio oblongo-ovato obtuso dorso convexiusculo ventre unicarinato, foliis involucralibus lobulo ovato acuto margine ventrali unidentato, amphigastrio elongato obovato bifido utrinque extus unidentato.—*Lond. Journ. Bot.* 1845, *p.* 88. *G. L. et N. Syn. Hep. p.* 412. (TAB. CIII. Fig. 6.)

HAB. Northern Island: Bay of Islands, on Lichens and rocks, *J. D. H.* Port Nicholson and Titiokura, etc., *Colenso.* Amongst Lichens, Wellington, *Stephenson.*

Sordide viridis, olivacea, et subnigra. *Caulis* pollicaris, bipinnatus. *Folia* marginibus dorsalibus sæpe decoloratis albidis patulo-recurvis, ventralibus medio sinuatis et cum auriculis compressis cauli adpressis. *Amphigastria* sinu parvo bifida. *Perianthium* læve, dorso convexo, apice supremo tantum lævissimo bicarinato.

This species has a very close resemblance to *F. squarrosa*, so that without the perianths the plants might be confounded. The form of the leaves and lobule is as in *F. pycnantha*, and their true form is only to be seen by pressing them out, for the lower portion of the leaf with the lobule is curved round on the ventral side of the stem, so that the lobule is forced round with it.—PLATE CIII. Fig. 6:—1, stems, *natural size;* 2, a portion of the same with leaves and stipules; 3, a perianth and involucral leaves as seen on the ventral side; 4, a transverse section of the perianth about the middle; 5, the same just below its apex:—*all magnified.*

3. Frullania *pycnantha*, Hook. fil. et Tayl.; caule procumbente ramis brevibus pinnatim ramoso, foliis patenti-recurvis late ovatis apice rotundatis lobulo parvo galeæformi compresso, amphigastriis suborbiculatis bifidis medio carinatis marginibus subrecurvis, perianthio oblongo obovato dorso convexo ventre unicarinato toto superficie lacinulis minutis obsito, foliis involucralibus conformibus lobulo ovato-lanceolato parce lacinulato dentato basi cum amphigastrio oblongo profunde bifido laciniis divergentibus lanceolatis extus repandis dentatisque coalitis.—*Lond. Journ. Bot.* 1844, *p.* 566. *G. L. et N. Syn. Hep. p.* 411.

HAB. Northern and Middle Islands: Bay of Islands, *J. D. H.* East Coast, Cook's Straits, and interior, *Colenso.* Amongst *Madotheca Stangeri*, Thomson's Sound, *Lyall.* Upon Lichens, Wellington, *Stephenson.*

Olivaceus, rufescens. *Caulis* 1–1½-pollicaris, gracilis. *Folia* imbricata, apice patenti-recurva, squarrosula, margine ventrali sinuato lobuloque incurvo. *Perianthium* obtusum, apiculatum.

Very closely allied to *F. æolotis*, Nees, *F. ericoides*, Nees, *F. squarrosa*, Nees, *F. squarrosula*, and probably also to *F. laciniosa*, Gottsche, but apparently distinct in the form of its perianth. It is a much smaller plant than *F. squarrosa* and *F. squarrosula.*

4. Frullania *Hampeana*, Nees. *G. L. et N. Syn. Hep. p.* 426.

HAB. Northern Island: on the bark of trees, Titiokura, Manawatu River, *Colenso.*

The specimens referred to this species are rather small, but the plant is easily recognized by its deflexed acuminated lobules, and dentate stipules.

5. Frullania *falciloba*, Hook. fil. et Tayl., *Lond. Journ. Bot.* 1844, *p.* 581. *G. L. et N. Syn. Hep. p.* 423.

HAB. Northern Island: bark of trees, Wairarapa valley, etc., *Colenso.*

6. Frullania *spinifera*, Hook. fil. et Tayl.; caule procumbente pinnatim ramoso, foliis laxe imbricatis divergentibus ovato-ellipticis apice rotundatis, lobulis parvis galeatis apicibus subulatis decurvis nonnullis evolutis lanceolatis, amphigastriis orbiculatis breviter bifidis, perianthio elongato subcylindrico lævi, foliis

involucralibus lanceolatis acutis, lobulo lanceolato-subulato extus unidentato, amphigastrio sinu lato rotundo bifido laciniis lanceolatis.—*Lond. Journ. Bot.* 1846, *p.* 407. *G. L. et N. Syn. Hep. l.c.* (TAB. CIV. Fig. 2.)

HAB. Northern Island: Auckland, *Sinclair*. Bark of trees, Tehawera forest, *Colenso*.

Fusco-viridis. *Caulis* 1–1½-pollicaris. *Folia* subremota, lobulo parvo uncinato subcompresso vel explanato erecto. *Perianthium* tumidum, trigono-cylindricum, apice subretuso mucronato.

A very distinct species, readily recognized by its small hooked lobules and inflated subcylindrical perianths. In size it comes near to *F. cyparoides* (Schw.).—PLATE CIV. Fig. 2:—1, a stem, *natural size*; 2, a portion of the same with leaves and stipule; 3, a perianth with involucral leaves and stipule as seen on the ventral side; 4, a transverse section of the perianth:—*all magnified.*

7. Frullania *deplanata*, Mitten; caule repente pinnatim ramoso, foliis imbricatis ovatis obtusis apice incurvis lobulo magno galeæformi compresso decurvo, amphigastriis suborbiculatis breviter bifidis, perianthio elongato obcordato deplanato lævi, foliis involucralibus ovatis acutis integerrimis repando-dentatisve lobulo lanceolato extus dentato, amphigastrio elongato apice laciniato dentato. (TAB. CIV. Fig. 3.)

HAB. Northern Island: on Lichens near Wellington, *Stephenson* (*Herb. Mitten*). Bark of trees, East Coast and interior, abundant, *Colenso*.

Fusco-rubra. *Caulis* pollicaris, repens. *Folia* divergentia, lobulis apicibus decurvis. *Amphigastria* apice patula, brevissime bidentata. *Perianthium* superne deplanatum, retusum, mucronatum.

This somewhat resembles a small state of *F. falciloba*, in the form of its leaves and decurved lobules, but in its perianth is different from that of every other species, corresponding with certain species of *Lejeunia*. The plants are closely creeping, and in some states the perianth has its apex bent downwards.—PLATE CIV. Fig. 3:—1, a stem, *natural size*; 2, a portion of the same, with leaves and stipule; 3, a perianth, with involucral leaves and stipule, as seen on the ventral side; 4, a transverse section of the perianth:—*all magnified.*

8. Frullania *reptans*, Mitten; caule repente pinnatim ramoso, foliis obovatis divergentibus lobulis magnis galeatis subcompressis, amphigastriis parvis cuneatis quadridentatis, perianthio oblongo-ovato subobtuso mucronato dorso planiusculo ventreque convexo anguste quadricarinato marginibus carinisque superne subrepando-dentatis, foliis involucralibus ovatis rotundatis lobulo lanceolato extus unidentato, amphigastrio bifido extus utrinque unidentato. (TAB. CIV. Fig. 4.)

HAB. Northern Island: bark of *Edwardsia*, East Coast, *Colenso*.

Sordide olivacea vel subnigra. *Caulis* exilis, semipollicaris, repens, pinnatim vage ramosus, vel cæspitosus. *Folia* laxe imbricata, lobulo dimidium folii æquante. *Amphigastria* cuneata vel obovata, bifida. *Perianthium* oblongo-ovatum, basi attenuatum, dorso carinis mediis altioribus marginibus repandis fere lævibus.

A smaller species than *F. fugax*, with lobules like *F. dilatata*. The perianths, which are very different from those of its near allies, have here and there along their margins and carinæ a cell more prominent than the rest.—PLATE CIV. Fig. 4:—1, stems, *natural size*; 2, a portion of the same with leaves and stipule; 3, a perianth, involucral leaves, and stipule; 4, a transverse section, from a little above the middle of the perianth:—*all magnified.*

9. Frullania *fugax*, Hook. fil. et Tayl.; caule repente vage subpinnatim ramoso, foliis imbricatis rotundatis lobulis magnis rotundo-ovalibus ore paullo dilatatis superne incumbentibus, amphigastriis parvis subrotundis bifidis laciniis integerrimis vel repando-unidentatis, perianthio obovato apiculato dorso planiusculo obtuso bicarinato ventre latissime carinato, foliis involucralibus elongatis obtusis lobulo lanceolato, amphigastrio lanceolato bifido laciniis acutis integerrimis vel repando-dentatis.—*Lond. Journ. Bot.* 1845, *p.* 87. *G. L. et N. Syn. Hep. p.* 445. (TAB. CIV. Fig. 5.)

HAB. Northern Island: on *Parmelia reticulata* (Tayl.), Bay of Islands, *J. D. H.* East Coast, etc., *Colenso*. Near Wellington, on *Parmelia, Stephenson*.

Fusco-rubra. *Caulis* parvus, gracilis, semipollicaris. *Folia* divergentia, lobulis magnis, dimidium folii æquantibus, incumbentibus. *Amphigastria* rotundata vel obovata.

A small species, with the habit of the European *F. dilatata;* it is, however, much less, and is easily known from most others by the top of the lobule approaching the stem.—Plate CIV. Fig. 5:—1, a stem, *natural size;* 2, a portion of the same with leaves and stipule; 3, a perianth with involucral leaves and stipule; 4, a transverse section of the perianth at about the middle.

10. Frullania *incumbens,* Mitten; caule repente vage ramoso, foliis patentibus oblique obovatis apice cucullato-incurvis lobulo oblongo incumbente cauli adpresso ore dilatato, amphigastriis late obovatis bifidis, perianthio oblongo-obovato dorso plano ventre carinato, foliis involucralibus lobulo ovato-lanceolato unidentato, amphigastrio ovato bifido laciniis ovatis acutis. (Tab. CIV. Fig. 6.)

Hab. Northern Island: bark of *Edwardsia,* Wairarapa valley; East Coast and interior, *Colenso.*

Olivaceo-viridis, fuscescens. *Caulis* semipollicaris. *Folia* imbricata, apice margineque ventrali supremo inflexo, lobulo magno incumbente superne cauli adpresso. *Perianthium* læve.

In size and habit this species resembles *F. dilatata,* for its branches, although short, are rather stout. The incumbent lobules have their upper parts closely applied to the ventral surface of the stem, and touch each other; so that when the stems are seen from below, they have an appearance very different from all allied species, excepting *F. fugax,* but from which, however, this is easily distinguished by the inflexed apices and upper portion of the ventral margins of its patent leaves, by the much more incumbent lobule, and by the triquetrous form of its perianth.—Plate CIV. Fig. 6: 1, a stem, *natural size;* 2, a portion of the stem with leaves and stipule; 3, a perianth with involucral leaves and stipule; 4, a transverse section of the perianth taken from just above the middle: —*all magnified.*

11. Frullania *pentapleura,* Hook. fil. et Tayl.; caule repente vage ramoso, foliis divergentibus rotundatis lobulo magno galeato paulo decurvo, amphigastriis parvis suborbiculatis bifidis marginibus integerrimis vel repando-unidentatis, perianthio oblongo-ovato vel obcordato mucronato compresso dorso ventreque bicarinato marginibus carinisque undulatis repandis, foliis involucralibus ovatis lobuloque ovato unidentato obtusiusculis.—*Lond. Journ. Bot.* 1846, *p.* 402. *G. L. et N. Syn. Hep. p.* 775. (Tab. CIV. Fig. 7.)

Hab. Northern Island: woods, Tarawera, *Colenso.* Auckland, *Sinclair.*

Fusco-rubra vel subnigra. *Caulis* bi-tri-linearis, vage ramosus. *Folia* imbricata, apicibus parum incurvis, e cellulis majusculis pellucidis areolata. *Amphigastria* parva, caule latiora. *Perianthium* carinis angustis undulato-repandis. *Spicæ masculæ* lineares.

This minute species has all the habit and appearance of *F. fugax* and of *F. Eboracensis,* Gottsche, of North America, but it is distinguished from all its allies by its six-sided perianths; its leaves have more pellucid and rather larger cells than most of the New Zealand species which it nearly resembles.—Plate CIV. Fig. 7:—1, a stem, *natural size;* 2, a portion of the stem with leaves and stipule; 3, a perianth with involucral leaves and stipule; 4, a transverse section of the perianth at the middle:—*all magnified.*

12. Frullania *congesta,* Hook. fil. et Tayl., *Flor. Antarct. p.* 164. *G. L. et N. Syn. Hep. p.* 451.

Hab. Northern Island: Titiokura forest, Tehawera, etc., *Colenso.* Auckland, *Sinclair.* Creeping over Lichens near Wellington, *Stephenson* (*Herb. Mitten*).

13. Frullania *aterrima,* Hook. fil. et Tayl.; perianthio obovato triquetro, foliis involucralibus longioribus angustioribus acutis amphigastrioque profunde bifido laciniis acuminatis integerrimis.—*Flor. Antarct. p.* 164. *t.* 66. *f.* 3.

Hab. Northern Island: Beech-woods, etc., Wairarapa Valley, and Ruahine mountains, *Colenso.*

Nearly as this species resembles *F. congesta,* it may be readily distinguished by the usually four-toothed stipules, and by the presence of a cluster of enlarged cells at the base of the leaf near the ventral side.

14. Frullania *hypoleuca*, Nees. *G. L. et N. Syn. Hep. p.* 443.

HAB. Northern Island: on Lichens, Wellington, *Stephenson* (*Herb. Mitten*).

15. Frullania *ptychantha*, Mont., *Annal. des Sc. Nat. tom.* 19. *p.* 258. *Voy. au Pôle Sud,* 1. *p.* 225. *t.* 19. *f.* 3. *Flor. Antarct. p.* 163. F. myosota, *Lond. Journ. Bot.* 1844, *p.* 393.

HAB. Northern Island: near Wellington, *Stephenson* (*Herb. Mitten*). Middle Island, *Lyall.*

Also found in Lord Auckland's and Campbell's Islands.

16. Frullania *cornigera*, Mitten; caule procumbente, ramis remotis pinnatim ramosis, foliis imbricatis divergentibus rotundo-ovalibus apice rotundatis incurvis tenuissime hyalino-marginatis lobulis binis tubulosis attenuatis apicibus decurvatis lobulo externo deflexo interno patulo, amphigastriis reniformi-rotundatis integris integerrimisque apicibus subrecurvis. (TAB. CIV. Fig. 8.)

HAB. Northern and Middle Islands: Bay of Islands, *J. D. H.* Amongst *Sendtnera attenuata*, Port Cooper, *Lyall.*

Fusco-olivacea, opaca. *Caulis* biuncialis, ramis brevibus remotis patentibus. *Folia* minutissime areolata, opaca, amphigastriisque tenuissime hyalino-marginata. *Lobuli* tubulosi, apice decurvi, basi cauli contigui, intense fusci.

A most remarkable species, so remote from all others that it may form a distinct genus if the perianth should prove sufficiently different from that of *Frullania*. The curious tubular lobules, the outer of which is very much deflexed, whilst the inner is only patent, correspond to those usually found in the genus, excepting that they are open at the summit, and not at the base; in this particular it recedes more from *Frullania* than in the lobules being double, for the inner lobule may be supposed to be formed of that slender lacinia which is probably present in all *Frullaniæ*, although hitherto only ascribed to those in which it is evident.—PLATE CIV. Fig. 8:—1, a stem, *natural size;* 2, a portion of the same with leaves and stipule:—*magnified.*

Gen. XXI. FOSSOMBRONIA, *Raddi.*

1. Fossombronia *pusilla*, Nees. *G. L. et N. Syn. Hep. p.* 597. *Flor. Antarct. p.* 448.

HAB. Northern Island: banks, wet palings, etc., East Coast, Ahuriri, Hawke's Bay, etc., *Colenso.* (A native of England.)

Some of the specimens referred to this species do not exactly correspond in appearance with British examples, but there seems to be no real difference in the form of their leaves or perianth. It has been found in the remote island of Kerguelen's Land, but hitherto in no other Antarctic island.

2. Fossombronia *intestinalis*, Taylor; caule simplici divergenti-furcatove, foliis adscendentibus plicato-convolutis undulatis inciso-lobatis, lobis acutis, perianthio campanulato crenato.—*Lond. Journ. Bot.* 1846, *p.* 408. *G. L. et N. Syn. Hep. p.* 469 *et* 785.

HAB. Northern Island: Bay of Islands, *J. D. H.?*

Frondes 3–4 lineas longæ, radicellis purpureis terræ adfixæ. *Capsula* sphærica, irregulariter dehiscens; semina muricata. *Elateres* longius quam in *F. pusilla.*

Readily distinguished from *F. pusilla* by its rather closely imbricated tumid leaves.

Gen. XXII. NOTEROCLADA, *Tayl.*

1. Notoroclada *porphyrorhiza*, Mitten.—N. confluens, *Tayl. Lond. Journ. Bot.* 1844, *p.* 478. *Flor. Antarct. p.* 446. *t.* 161. *f.* 7 *in part.* Androcryphia porphyrorhiza, *Nees. G. L. et N. Syn. Hep. p.* 470. Jungermannia porphyrorhiza, *Nees in Martius Flor. Brasil.* I. 1. *p.* 343.

Hab. Northern Island: watercourses, Titiokura, *Colenso.*

There appears to be little difference between the specimens of this plant from various Antarctic regions (Fuegia, the Falkland Islands, and Kerguelen's Land) and those gathered in Brazil by Mr. Gardner, except that the leaves are rather thinner in the latter; but they are so much altered by drying that none of them revive very perfectly by maceration, however long continued.

Gen. XXIII. PETALOPHYLLUM, *Gottsche.*

1. Petalophyllum *Preissii,* Gottsche; lamellis frondis marginem versus liberis costam versus connatis loculos formantibus, *G. L. et N. Syn. Hep. p.* 472.—Riccia laminifera, *Tayl. MSS. in Drummond's Swan River Mosses.*

Hab. Northern Island: Fern hills, Hawke's Bay, *Colenso.*

The *Riccia? tuberosa,* Tayl. (Lond. Journ. Bot. 1846, p. 415), is possibly the male plant of this, or at least of an allied species. The present is a West Australian species.

Gen. XXIV. ZOOPSIS, *Hook. fil. et Tayl.*

1. Zoopsis *argentea,* Hook. fil. et Tayl., *Flor. Antarct. p.* 167. *t.* 66. *f.* 6. *G. L. et N. Syn. Hep. p.* 473 *et* 785.

Hab. Northern Island: in various places, *Colenso.* Auckland, *Lyall.*

This minute and curious species would appear to be of very frequent occurrence in New Zealand, being commonly intermixed with other *Hepaticæ;* and is found as far south as Lord Auckland's Group. The figure quoted above, although giving a good general representation of the plant, does not show its more perfect state. In the latter the margins have not that prominent cluster of cells, but the outer cells stand out like the teeth of a saw, and each of them has at its apex a small tubular ciliiform appendage, which, at its base, is curved, so that these cilia all point towards the apex of the stem. This peculiarity of structure seems analogous to the cilia which fringe the margins of the fronds of *Metzgeria furcata.* It is to be regretted that the fructification of this remarkable plant is in too immature a state to afford any decided characters.

Gen. XXV. PODOMITRIUM, *Mitten.*

Involucrum ventrale, brevissime pedicellatum, basi squamulis paucis cinctum. *Perianthium* tubulosum. *Antheræ* in spicis parvis brevipedicellatis congestæ.—Frondes *oblongæ, stipitatæ.*

1. Podomitrium *Phyllanthus,* Mitten.—Steetzia Phyllanthus, *Nees. G. L. et N. Syn. Hep. p.* 478. Diplolæna cladorhizans, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1844, *p.* 570. Jungermannia Phyllanthus, *Hook. Musc. Exot. t.* 95. *Flor. Antarct. p.* 167.

Hab. Common throughout the Islands: Bay of Islands, *J. D. H., Colenso, Menzies, etc.* On tree-ferns, Southern Island, *Lyall.*

Found as far south as Auckland's Island. This genus differs abundantly from *Steetzia,* to which alone it can be justly compared, in the ventral origin of its perianth and its pedicellate male spikes. In *Steetzia* the perianth is dorsal, and the anthers are also dorsal and imbedded on each side of the nerve. From *Symphyogyna* it further differs in the presence of a true perianth. The latter arises from a very short footstalk, which, like that of *Sarcomitrium,* is surrounded by minute irregular scales, forming a kind of involucre; in texture and form the perianth closely resembles that of *Steetzia Lyallii.* The calyptra has a few barren pistils scattered over its upper surface, but is not echinulate. Male spikes one line long, with numerous anthers imbedded in their substance; they arise not from the central nerve-like line, but towards the middle of the frond near to it, in the same manner that innovations have been observed to

spring from the ventral side of *Steetzia pisicolor*, Hook. fil. et Tayl., whose fronds possess a similar central line throughout their length. Both the male spikes and perianth arise from the lower parts of the fronds, or the stipes, and then seem to be lateral, as in the figure in 'Musci Exotici.' The closest resemblance in habit and general appearance exists between *Podomitrium Phyllanthus*, *Steetzia Lyellii*, and *Symphyogyna subsimplex*, Mitten, so that in the barren state their areolation alone distinguishes them: this in *P. Phyllanthus* is more minute and opaque.

Gen. XXVI. STEETZIA, *Lehm.*

1. Steetzia *Lyellii*, Nees. *G. L. et N. Syn. Hep. p.* 475 *et* 785.

HAB. Northern Island: clay banks, East and South Coast, *Colenso*. (A native of England.)

This variable species is found in nearly all parts of the world. The New Zealand specimens do not differ from those gathered in Britain, except that the perianth is rather longer.

2. Steetzia *tenuinervis*, Hook. fil. et Tayl.; fronde gracili prostrata lineari dichotoma nervo gracili percursa margine dentata.—Diplolæna tenuinervis, *Lond. Journ. Bot.* 1844, *p.* 570. *G. L. et N. Syn. Hep. p.* 477.

HAB. Northern Island, *Colenso*.

"Fronds scarcely two inches long, pea-green, linear, but slightly broader at their tops, where they are bilobate with a very shallow sinus. The substance is thin, the cells distinct, the nerve pale yellow, very slight and opaque, having on each side a series of denser and greener cells than on the rest of the frond; the margin is furnished with distant but large teeth. This is exceedingly like the British *Jung. Hibernica*, Hook., but its nerve is more slender, the dentation of the margin more pronounced, the substance of the frond thinner, and its cells are more clearly defined." *Taylor, l. c.*

A very doubtful species, which seems to present no other character but the more dentate margins of its fronds, to distinguish it from *S. Lyellii*.

3. Steetzia *xiphoides*, Hook. fil. et Tayl.; fronde procumbente dichotoma anguste lineari margine serrata.—Diplolæna xiphoides, *Lond. Journ. Bot.* 1844, *p.* 567. *G. L. et N. Syn. Hep. p.* 476.

HAB. Northern Island: Bay of Islands, *J. D. H.* Wet wood, Manawatu river, often growing under water, *Colenso*.

Viridis. *Frondes* bipollicares, ½ lin. latæ, parce dichotome ramosæ, margine serrato. *Involucrum* e foliolis sub-5 lanceolatis formatum.

Very distinct from all the described species of *Steetzia* and of *Symphyogyna*, and in size and general habit very similar to the larger forms of *Metzgeria furcata*. The involucra are too young to give a correct idea of their nature when in fruit. The only plant with which the present can be correctly compared is the *Steetzia linearis* (Sw.), Mitten, which, from Swartz's specimens (Herb. Hook.), appears to be a smaller plant, with a more close areolation and more strongly defined cartilaginous margin.

Gen. XXVII. SYMPHYOGYNA, *Mont. et Nees.*

1. Symphyogyna *flabellata*, M. et N. *G. L. et N. Syn. Hep. p.* 481. Jungermannia flabellata, *Hook. Musc. Exot. t.* 13. *Flor. Antarct. p.* 167. *Lab. Fl. Nov. Holl. v.* 2. *p.* 109. *t.* 254. *f.* 1.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies*. Forests, Wairarapa, Tehawera, etc., *Colenso*. Port William, Southern Island, *Lyall*.

2. Symphyogyna *leptopoda*, Hook. fil. et Tayl.; rhizomate filiformi repente ramoso, frondibus flabelliformibus erectis trichotomis, laciniis linearibus integerrimis teneris.—*Lond. Journ. Bot.* 1844, *p.* 571. *G. L. et N. Syn. Hep. p.* 482.

HAB. Northern and Middle Islands: Bay of Islands, *J. D. H.* Hokianga, *Joliffe*. Tararua and Wairarapa, *Colenso*. On trees, Otago, *Lyall*.

Pallide viridis, tenera. *Stipes* pollicaris, tenuissime alatus, apice tripartitus et in frondem flabelliformem dilatatus.

Very closely resembling *S. flabellata*, but its fronds are of a very much thinner texture and have broader laciniæ in proportion to their size.

3. Symphyogyna *Hymenophyllum*, M. et N. *G. L. et N. Syn. Hep. p.* 480. Jungermannia Hymenophyllum, *Hook. Musc. Exot. t.* 14.

HAB. Northern and Middle Islands: Dusky Bay, *Menzies*. Bay of Islands, *J. D. H.* Tehawera, Ahuriri, Tarawera, etc., *Colenso*. Great Barrier Inlet, *Sinclair*. Port Cooper, *Lyall*.

4. Symphyogyna *rhizobola*, Nees. *G. L. et N. Syn. Hep. p.* 483. Jungermannia rhizobola, *Hook. Musc. Exot. t.* 87.

HAB. Northern Island: Bay of Islands, *J. D. H.* Mohaka river, Cape Turnagain, Tewiti, Hawke's Bay, etc., *Colenso*. Auckland, *Col. Bolton*.

All the specimens referred to this species correspond with each other in their dark green colour, and in having the apices of their fronds attenuated. The margin appears to vary considerably, both in the size of the teeth and in the prominence of the less pellucid cells, which form the margin itself: these cells are in a single row, and are present in all the allied species, although easily overlooked.

5. Symphyogyna *subsimplex*, Mitten; fronde lineari simplici rarius furcatim ramosa inferne sensim in stipitem attenuata margine integerrima.

HAB. Northern Island: Bay of Islands, *J. D. H.* Auckland, *Sinclair*. Tree-ferns, East Coast, Manawatu river, *Colenso*. Southern Island, *Lyall*.

Viridis. *Frondes* planæ, sesquipollicares, 2 lin. latæ, apice rotundatæ, retusæ, integerrimæ, e cellulis hexagonis areolatæ, teneræ. *Involucrum* squamæforme, dentato-lacerum, subbipartitum. *Calyptra* clavata, apice pistillis abortivis coronata.

The fronds of this species are unaltered in drying; they appear to grow together in patches, and arise from a creeping rhizoma, as is the habit of the allied species, although the specimens show scarcely any trace of that part. Readily recognized from all its congeners by its linear simple fronds, excepting *S. Gottscheana*, M. et N., from Mauritius, which (from the description) would appear to be very near to the present, but to differ in the repand fronds and the presence of innovations from the emargination at their apices.

Gen. XXVIII. METZGERIA, *Raddi*.

1. Metzgeria *furcata*, Nees. *G. L. et N. Syn. Hep. p.* 502. *Flor. Antarct. p.* 167 *et* 445.

Var. *major*; uncialis et ultra, subfastigiatim furcata.—Jungermannia furcata, β elongata, *Hook. Brit. Jung. t.* 56. *f.* 2. *G. L. et N. Syn. Hep. p.* 502.

Var. *minor*; confertius divisa, laciniis aliis furcatis aliis simplicibus.—Jungermannia furcata, *Hook. Brit. Jung. t.* 56 (*excl. f.* 2). *G. L. et N. Syn. Hep. p.* 503.

HAB. Var. *major*, Northern and Middle Islands: East Coast, etc., in various localities, *Colenso*. Port Cooper, *Lyall*. Var. *minor*, Bay of Islands, *J. D. H.* Wairarapa Valley, Cape Turnagain, etc., *Colenso*. Wellington, *Stephenson* (*Herb. Mitten*). (A native of England.)

A cosmopolitan plant. None of the New Zealand specimens differ from British forms of this polymorphous species, which seems to be common in all parts of the world. Besides the species common to Europe, the warmer parts of the American continent produce several peculiar ones: of these *M. procera* is very near to *M. furcata* in size and habit, but far more laxly areolate; another is distinguished by its pinnated stems; and a third is described with

its ventral side alone pubescent: all these species are very closely allied in structure, habit, and appearance, and rank much more naturally as a genus of themselves, than as combined with *Sarcomitrium.*

Gen. XXIX. SARCOMITRIUM, *Corda.*

Frondes latinervæ, sinuatæ, pinnatifidæ vel bipinnatæ. *Involucrum* laterale, breve, lacerum. *Perianthium* 0. *Calyptra* carnosula, elongata, subcylindrica. *Antheræ* lobulis frondis propriis a tergo immersæ. —Aneura, *Dumort. G. L. et N. Syn. Hep. p.* 493.

This genus contains all the *Aneuræ*, and part of the *Metzgeriæ*, of the 'Synopsis Hepaticarum,' where the fronds have been described as nerveless, though consisting of very little beside nerve. In *S. pingue*, and the wider-lobed species, there is but a single row of cells on each side of the nerve, to represent the leafy tissue of the plants. *Aneura* being therefore inapplicable, *Sarcomitrium* has been adopted as the better generic name.

1. Sarcomitrium *alternilobum*, Mitten; fronde applanata vage ramosa, ramis alternatim obtuse lobatis apice rotundatis crenatis, margine minute remoteque denticulato, calyptra setulosa.—Aneura alterniloba, *Lond. Journ. Bot.* 1844, *p.* 527. *G. L. et N. Syn. Hep. p.* 496.

HAB. Northern Island: watercourses and wet banks, Bay of Islands, East Coast, and interior, *Colenso, J. D. H., Sinclair.*

Nigro-viride. *Frons* bipollicaris, vage ramosa, tenuis, prostrata, apice rotundata crenulataque. *Calyptra* setulis pallidis obtecta. *Capsula* lineari-oblonga; pedunculo unciali.

Distinct from *S. pingue* (Linn.) in its more regularly alternately lobed fronds, which have their margins remotely denticulate, and which appear to be of a thinner texture.

2. Sarcomitrium *palmatum*, Mitten.—Jungermannia palmata, *Hedw. Thor. Gen. ed.* 1. *t.* 18. *f.* 93–95. Aneura palmata, *Nees. G. L. et N. Syn. Hep. p.* 498.

HAB. Northern Island: dense Beech forests on the East Coast, *Colenso.*

3. Sarcomitrium *crassum*, Mitten; fronde procumbente pinnatifida subopaca laciniis obtusis.—Jungermannia crassa, *Schwægrichen, Prodr. p.* 31. Aneura crassa, *Nees. G. L. et N. Syn. Hep. p.* 500.

HAB. Northern Island: dense forests on the East Coast and interior, *Colenso.*

The specimens referred to this species are of a very rigid opaque texture, and of a brown or blackish-green colour; the stems are branched in a pinnate manner, and when dry the plants are almost horny.

4. Sarcomitrium *pinnatifidum*, Mitten.—Aneura pinnatifida, *Nees. G. L. et N. Syn. Hep. p.* 495.

HAB. Middle Island: south extreme, *Lyall.*

5. Sarcomitrium *multifidum*, Mitten.—Jungermannia multifida, *Linn. Sp. Pl. ed.* 2. *p.* 1602. *Hook. Brit. Jung. t.* 45. Aneura multifida, *Dumort., G. L. et N. Syn. Hep. p.* 496. *Fl. Antarct. p.* 167 *et* 444.

HAB. Northern and Middle Islands: wet banks and watercourses, Bay of Islands, East Coast, and interior, *J. D. H.* Port Cooper, *Lyall, Colenso, etc.* (A native of England.)

These specimens differ in no particulars from European. This species is cosmopolitan, and found as far south as Campbell's Island and Cape Horn.

6. Sarcomitrium *prehensile*, Mitten.—Metzgeria prehensilis, *Hook. fil. et Tayl. Fl. Antarct. p.* 445. *t.* 160. *f.* 9. *G. L. et N. Syn. Hep. p.* 505.

HAB. Northern Island: dead wood, Manawatu river, *Colenso.* Port Nicholson, *Lyall.*

Originally found at Cape Horn.—This species has a pruinose appearance when dry, which is also observable in the following, but it does not arise from any kind of pubescence.

7. Sarcomitrium *eriocaulum*, Mitten.—Jungermannia eriocaula, *Hook. Musc. Exot. t.* 72. Metzgeria eriocaula, *G. L. et N. Syn. Hep. p.* 505.

HAB. Middle Island: Dusky Bay, *Menzies*. Port Nicholson, *Lyall*.

Easily distinguished from the other species by its short pubescence.

Gen. XXX. PLAGIOCHASMA, *Lehm. et Ldbg.*

1. Plagiochasma *australe*, Nees; fronde lineari-elongata apice retusa marginibus crenulato-rugulosis, squamis ventralibus acutis apiculatis superioribus ultra marginem prominentibus, fructibus medio frondis seriatis, pedunculo basi paleaceo, receptaculo 2–4-carpo subtus paleis barbato.—*G. L. et N. Syn. Hep. p.* 514. Fegatella australis, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1844, *p.* 572.

HAB. Northern Island: Bay of Islands, *J. D. H.* Hokianga, *Jolliffe*. In water, Tehawera and Patea, *Colenso*.

Frondes pollicares, lineares, innovationibus ventralibus ramosæ, marginibus purpureis. *Squamæ* latiusculæ, purpureæ; apicibus hyalinis. *Pedunculus* brevissimus elongatusve, nunc pollicaris, basi paleis lineari-lanceolatis cinctus. *Receptacula fœminea* subrotunda, rugulosa, loculis tumidis, paleis linearibus; *mascula* disciformia, papillata, prope fœminea disposita.

Similar in habit and appearance to *P. Aitonia*, Lind. et Nees, from Madeira, and, like it, belonging to the section of the genus with innovations from the ventral side of the fronds, and not from their apices.

Gen. XXXI. MARCHANTIA, *Linn.*

1. Marchantia *tabularis*, Nees. *G. L. et N. Syn. Hep. p.* 525. M. polymorpha, *Hook. fil. et Tayl. Fl. Antarct. p.* 168 *et* 446.

HAB. Northern and Middle Islands: trunks of trees, Auckland, Waikehi, and Mount Egmont, *Sinclair*. Bay of Islands, *J. D. H.* East Coast and interior, *Colenso*. Near Wellington, *Stephenson*. Port Cooper, and Southern Island, *Lyall*.

This differs from *M. polymorpha* in the more convex fronds, which show no trace of the dark nerve so conspicuous in that species. The cells are more minute, and, from the prominence of the pores, have a rough appearance. *Male receptacles* on very short peduncles, never exceeding half an inch in height. *Peduncle* of the *female receptacle* 1–4 inches long. *Rays* of the *receptacle* shorter, and the involucra less deeply laciniate than in *M. hemisphærica*. *M. Berteroana*, Lehm. et Ldbg., from Juan Fernandez and Peru, comes very near to *M. tabularis* in habit, size, and structure of its fronds, but its male receptacles are borne on peduncles which equal those of the female, and their segments are more quadrate, and slightly emarginate; both these species are more robust than *M. polymorpha*. All the specimens from various parts of the Antarctic regions, referred by Dr. Taylor to *M. polymorpha*, belong to *M. tabularis*.

2. Marchantia *nitida*, Lehm. et Ldbg., *in Lehm. Pug. pl.* 4. *p.* 11. *G. L. et N. Syn. Hep. p.* 532.

HAB. Northern Island: Tuaraiawa river, etc., *Colenso*. East Cape, *Sinclair*.

These specimens appear to correspond in all respects with others from Nepal.

3. Marchantia *foliacea*, Mitten; receptaculo fœmineo excentrico umbonato circiter 8-lobo, lobis dilatatis explanatis foliaceis, involucris pallidis lacero-ciliatis, pedunculo basi squamoso apice barbato, fronde dichotome lobata viridi.

HAB. Northern Island: banks, base of Ruahine mountains, Cape Turnagain, etc., *Colenso*. Hokianga, *Jolliffe*.

Frondes bi-tripollicares, subcoriaceæ, planiusculæ, superne læviusculæ, subnitidæ, poris parvis pallidis, inferne

intense purpureæ, margine integerrimo repande-undulato. *Pedunculus* pollicaris, ramentis squamisque purpureis obtectus. *Receptaculum fœmineum* convexum, poris albido-limbatis punctatum; lobis latissimis, subcrenatis. *Scyphi* infundibuliformes, marginibus ciliato-dentatis, gemmulas lentiformes includentes.

A larger species than *M. nitida*. Allied to *M. disjuncta*, Sullivant, from the United States, in the broad and leafy lobes of its female receptacles, but the fronds of the latter are less coriaceous and opaque. In *M. foliacea* the surface of the fronds is nearly as glossy as that of *M. nitida*.

4. Marchantia *macropora*, Mitten; receptaculo fœmineo excentrico hemisphærico sub-5-lobo verrucoso lobis bipartitis, involucris margine purpureis laceris, fronde lineari dichotoma, poris magnis purpureo-limbatis.

HAB. Northern Island: wet banks, Makororo river, Ahuriri, etc., *Colenso*. Auckland, *Sinclair*.

Frondes sordide virides, 1–2-pollicares, 2 lin. latæ, margine plano integerrimo, subtus atro-purpureæ, medio radicellis vestitæ. *Squamæ* paucæ, obtusæ. *Pori* maximi, fusco-purpurei, remoti. *Receptaculum fœmineum* sub-hemisphæricum, verrucis tumidis apice porosis asperum. *Involucra* basi laciniis lanceolatis purpureis vestita. *Pedunculus* semipollicaris, laciniis paucis lanceolatis paleaceus.

At once distinguished from its allies by its large purple or brownish pores, and the tumid warts of its female receptacles, which have each a large purple-mouthed pore.

5. Marchantia *pileata*, Mitten; receptaculo fœmineo subexcentrico hemisphærico tuberculis brevibus ruguloso margine crenato, involucris margine laceris, fronde dichotoma, laciniis linearibus planiusculis lævibus, poris minutis.

HAB. Northern Island: wet banks, Makororo river, *Colenso*.

Frondes glauco-virides, tripollicares, 3 lin. latæ, integerrimæ, subtus atro-purpureæ. *Pori* minuti, albido-marginati. *Pedunculus* semipollicaris, læviusculus, atropurpureus. *Receptaculum fœm.* 2 lin. latum, subtus nudum.

A larger species than *M. viridula*, Lehm. et Ldbg., and with more linear fronds than *M. nitida*, to which they approach more nearly in the appearance of their surface. Only one female receptacle has been seen, which has the peduncle inserted either in, or very near its centre; it is hemispherical, and not so conical as that of *M. Brasiliensis* or *M. cartilaginea*. The latter species, although stated in the 'Synopsis Hepaticarum' to be from St. Vincent's, is marked "Nepal" in Herb. Hooker, and is mixed with *Bartramia Turneriana*, Schw.

Gen. XXXII. DUMORTIERA, *Reinw. Blume et Nees.*

1. Dumortiera *hirsuta*, Reinwardt, Blume et Nees. *G. L. et N. Syn. Hep. p.* 343. Marchantia hirsuta, *Swartz, Prodr. Fl. Occ. p.* 145. *Fl. Ind. Occid. v.* 3. *p.* 1897. Hygropyla dilatata, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1844, *p.* 576. *Flor. Antarct. p.* 168. *G. L. et N. Syn. Hep. p.* 543.

HAB. Northern and Middle Islands: Bay of Islands, *J. D. H.* East Cape, *Sinclair*. Akaroa, *Raoul*.

In the absence of fructification, the New Zealand specimens cannot be distinguished from those from various other parts of the world. The size is certainly very much greater, but this character cannot be depended upon in these plants. Also a native of Lord Auckland's Group.

Gen. XXXIII. FIMBRIARIA, *Nees.*

1. Fimbriaria *Drummondii*, Tayl.; fronde lineari-elongata viridi v. purpureo tincta, receptaculo fœmineo conico obtuso cellulis tumentibus rugoso, perianthiis late ovatis sub-12-fidis laciniis apice cohærentibus. *Lond. Journ. Bot.* 1846, *p.* 412. *G. L. et N. Syn. Hep. p.* 566, 791.

HAB. Northern Island: heights at Cape Kidnapper, Wairarapa Valley, etc., *Colenso*.

Frondes 1–1½ pollicares, dichotomæ, sæpius atropurpureæ. *Pedunculus* fere bipollicaris, gracilis, atropurpureus,

basi nudus. *Receptaculum fœm.* breviter conicum, obtusum, cellulis vesiculosis rugosum, subtus nudum vel filis paucis augustis barbatum. *Perianthium* albidum, apice plus minus purpureo-tinctum, laciniis latiusculis planiusculis. *Semina* punctulata, lutea.

One of the largest of this very curious genus. Its fronds in size and appearance resemble those of *Reboulia hemisphærica*, Raddi, and are generally stained above of the deep purple that prevails on the under surface of its congeners. The specimens seen by Dr. Taylor are not well developed, but have the fronds abbreviated, as is frequently the case in allied species, otherwise they correspond with those from New Zealand. There is but little resemblance between this species and *F. Nepalensis*, Tayl., which is a much smaller plant; it more nearly resembles *F. australis*, but differs in its greater size, and in the more bladdery cells on the top of its female receptacles, which have not the granulate appearance observable in that species; the perianths too are larger, and their laciniæ broader. In most specimens there is no trace of those filaments on the under side of the receptacle which are so evident in many other species, but in some a very few hair-like ones are present.

2. Fimbriaria *australis*, Hook. fil. et Tayl.; fronde lineari-dichotoma tenera apice bilobo, receptaculo fœmineo conico-hemisphærico tuberculato subquadrilobo subtus barbato, perianthiis ovatis 12–14-fidis laciniis apice cohærentibus.—*Lond. Journ. Bot.* 1844, *p.* 573. *G. L. et N. Syn. Hep. p.* 561.

HAB. Northern Island: banks of Mohaka river, *Colenso*. Auckland, *Col. Bolton*.

Frondes pollicares, dichotomæ, subtus purpureæ et squamis parvis lanceolatis obtusis præditæ. *Pedunculus* semipollicaris, inferne purpureus, superne viridis. *Receptaculum fœmineum* granuloso-tuberculatum, subtus pilis longiusculis barbatum. *Perianthia* pallida.

Our specimens of this species, so named by Dr. Taylor, are not remarkably large, and are much smaller than *F. Drummondii*, to which he compares them.

3. Fimbriaria *tenera*, Mitten; fronde oblonga obcordatave apice profunde bifida tenerrima venosa, pedunculo glabro tenui, receptaculo fœmineo convexiusculo tri-quadrilobo subtus nudo, perianthiis breviconicis octofidis, laciniis ovato-lanceolatis apice discretis.

HAB. Northern Island: clay banks, Pahawa and Patea, *Colenso*.

Frondes virides, semipollicares, 2 lin. latæ, dichotome ramosæ; rami fertiles cuneati. *Pedunculus* sesquipollicaris, gracillimus, pallide fuscus. *Receptaculum fœm.* parvum, subrugosum, margine crenulatum. *Perianthia* parva, laciniis pallide fuscis.

The three specimens of this small species differ considerably from each other in appearance, some being mature, and others apparently less developed, with some of the perianths burst before the elongation of the peduncle; it is possible that this premature bursting of the capsules (which occurs in various genera) is caused by the drying of the specimens. One specimen without fruit is of a very different-looking state, of a lively green colour, and much branched, but its structure appears to be the same. This species, although closely allied to *S. venosa*, Lehm. et Ldbg., from Brazil, and the others of this section, is more slender than any, the peduncle being remarkably so, and when dry flexuose. The deep purple colour so common in these plants is almost absent in this species, the older specimens of which become pale brown.

Gen. XXXIV. TARGIONIA, *Micheli.*

1. Targionia *hypophylla*, Linn., *Sp. Pl. ed.* 2. *v.* 2. *p.* 1604. T. Michelii, *Corda*. *G. L. et N. Syn. Hep. p.* 574.

HAB. Northern Island: not uncommon on moist banks, *Sinclair, Colenso, etc.*

Gen. XXXV. ANTHOCEROS, *Micheli.*

1. Anthoceros *lævis*, Linn., *Sp. Pl. v.* 2. *p.* 1606. *G. L. et N. Syn. Hep. p.* 586. Dendroceros

leptohymenius, *Hook. fil. et Tayl. Lond. Journ. Bot.* 1844. *p.* 575. *G. L. et N. Syn. Hep. p.* 580. Pellia carnosa, *Hook. fil. et Tayl. l. c. p.* 576. *G. L. et N. Syn. Hep. p.* 490.

Hab. Northern and Middle Islands: Bay of Islands, *J. D. H.* Auckland, *Sinclair.* Akaroa, *Raoul.* East Coast and interior, *Colenso.* Port Cooper, *Lyall.*

It is probable that some of the specimens referred to may prove distinct. The fertile plants correspond with European specimens, but there are some barren ones which are much elongated and branched, and are nearly destitute of rootlets beneath; these have a different look, which may be due to local causes. The *Dendroceros leptohymenius*, so fully described by Dr. Taylor, differs in appearance from the common prostrate forms of this plant. No New Zealand specimens of *Anthoceros punctatus*, Linn., have been seen, those so named by Dr. Taylor belonging to *A. lævis.* The *A. punctatus*, from Hermite Island, is apparently the *Dendroceros Jamesoni* (Tayl. in Lond. Journ. Bot. 1848, p. 285), which, however, can hardly be compared with *Dendroceros crispatus*, Hook.

2. Anthoceros *Jamesoni*, Tayl.; fronde enervi plana dissecta læviuscula margine minute lobulata, lobulis undulatis crenatis, involucro oblique truncato lævi, capsula longiuscula valvis apice cohærentibus.

Hab. Northern Island: Auckland, *Col. Bolton.*

Also found at Cape Horn (barren), *J. D. H.*; and at Quito (with perfect fruit), *Prof. Jameson.*—This species differs from all others excepting *A. giganteus*, Lehm. et Ldbg., in the crenate laciniæ of the margins of its fronds, which, however, are much more minute than in that species, a character of degree only, and perhaps not constant. The fronds of *A. giganteus* do not always show the nerve very distinctly, particularly in the part above the involucrum. The transition of *Anthoceros* into *Dendroceros* would appear to commence with *A. Jamesoni*, and there remains only the adhesion of the valves of the capsule on one side to distinguish the genera; an unsatisfactory character, for in *D. crispatus* the valves are sometimes as much separated as in *A. punctatus.* So far as can be judged from the figure, *Monoclea Forsteri*, Hook., differs scarcely at all in structure from *Anthoceros Breutelii*, Gottsche; and these two species may therefore prove congeneric, if the absence of the columella be considered a sufficient character to distinguish them from *Anthoceros*, with which they are in every other respect almost identical.

3. Anthoceros *giganteus*, Lehm. et Ldbg., *in Lehmann Pug. pt.* 4. *p.* 25. *G. L. et N. Syn. Hep. p.* 588.

Hab. Middle Island: Dusky Bay, *Menzies.* Port Cooper, *Lyall.*

4. Anthoceros *Colensoi*, Mitten; fronde late nervosa inordinate subpinnatifida margine lobulis flabellatis crenulatis sinuatisque prædita, involucro ruguloso, capsula arcuata uno latere tantum dehiscente, pedunculo incluso.

Hab. Northern Island: summit of Ruahine mountains, *Colenso.* Auckland, *Sinclair, Col. Bolton.*

Fusco-niger. *Frons* 1–2-pollicaris, vage ramosa, dorso ventreque lævi, margine irregulariter subpinnatim lobato, lobulisque parvis pallide pellucidis sinubus rotundatis quasi perforatis onusta. *Involucrum* plicis parvis rugulosum, apice subbilabiatum. *Capsula* pallide fusca, breviuscula.

A curious species, differing from *A. Javanicus*, Nees, in the much less laxly areolate lobulate margin of its fronds. It has also considerable resemblance to *A. glandulosus*, Lehm. et Lind., another Javan species; but although the habit appears to be very similar, the form of the lobules on the margin is totally different.

Gen. XXXVI. RICCIA, *Micheli.*

1. Riccia *acuminata*, Tayl.; fronde solida dichotome divisa substellata, laciniis canaliculatis marginibus erectis apice sursum adpressis, fructibus medio frondis aggregatis tumidis.—*Lond. Journ. Bot.* 1846, *p.* 414. *G. L. et N. Syn. Hep. p.* 793.

Hab. Northern Island: fern hills, Hawke's Bay, *Colenso.*

Frondes glauco-virides, carnosæ, subtus concolores, apice marginibus sursum conniventibus anticeque adpressis. *Sporæ* nigræ.

The habit of this is that of the European *R. glauca*, Linn., but it is much larger and has more deeply channelled fronds. The capsules are clustered and fill the cavity of the fronds. In describing the fronds as orbicular and an inch in diameter, Dr. Taylor alludes to the whole plant; but it must not be compared with *R. crystallina*, Linn., which has a frond of very different structure. The acuminate appearance of the fronds is entirely owing to the appression of the margins at the apices of the laciniæ.

2. Riccia *natans*, Linn., *Syst. Nat. ed.* 12. *v.* 2. *p.* 708. *G. L. et N. Syn. Hep. p.* 606.

HAB. Northern Island: Lake Roto-a-kiwa, *Colenso*. (A native of England.)

These specimens look different from the usual British states of the species, being much more thickly covered beneath with much elongated almost black-purple fimbriæ. The upper surface is pale yellow-green, bordered with deep purple. In all other respects they correspond with European and American specimens.

3. Riccia *fluitans*, Linn., *G. L. et N. Syn. Hep. p.* 610.

HAB. Northern Island: deep water, head of Wairarapa Valley, *Colenso*. (A native of England.)

NAT. ORD. CII. FUNGI.

By the Rev. M. J. Berkeley.

Though the list of *Fungi* here offered cannot be regarded as a perfect catalogue of all the species which exist in New Zealand, it is evidently, looking at its component parts, a fair sample of what may be expected, and therefore an analysis of it cannot be regarded as altogether useless.

The species enumerated or indicated are 158*, which may be classed as follows:—

British species	48
European, all of which, with the exception of *L. Fontanesii*, may be expected to occur in Great Britain	6
Cosmopolites, taking *Hypoxylon annulatum* in the widest sense	3
Tropical and subtropical	19
Ceylon	1
Antarctic	3
Van Diemen's Land	2
Sikkim Himalaya	1
New species	75
	158

The new species are divisible into three groups, consisting of—

Subtropical forms	28
Australian forms	5
European forms	42
	75

We have, therefore, on the whole—

Tropical and subtropical forms, including that from Ceylon, the cosmopolites, and the Australian	58
European forms, including that from Sikkim, and the Antarctic species	100

* A few species received since the above list was drawn up are not taken into account, and, to avoid confusion, are marked with an asterisk, instead of being numbered consecutively with the others.

The predominance therefore is greatly in favour of the European type, as far as any notion can be formed of what that type is. The word 'subtropical' is extended to all countries where, at certain seasons, the general range of temperature is high. The really tropical forms are few in comparison, and the *Fungi* are just what might be expected in a tolerably uniform climate, where there is no such marked depression of temperature as to destroy the mycelium of certain delicate species, and make their growth impossible. Such species as require a higher mean temperature than 50° or 60°, will not of course appear. Two South Carolina species occur rather unexpectedly, one of which travels as far south as Surinam; and it is possible that *Diatrype glomeraria* may be only a disguised form of the Pennsylvanian *D. smilacicola.*

Gen. I. AGARICUS, *L.*

Lamellæ membranaceæ, non deliquescentes, acie acuta, trama subfloccosa, cum hymenophoro infero concretæ.

The largest genus in the whole range of botany, containing more than a thousand species, notwithstanding the separation of several natural groups. Many of the species afford acceptable articles of food, and in some countries are extensively consumed. The common Mushroom, which is perhaps the best of all, occurs in almost every part of the world, and is not wanting in New Zealand, where the closely-allied *A. arvensis* also occurs. There can be little doubt that the number of species in the New Zealand Flora is far greater than what I am able to record here: indeed, several specimens exist in the collections, which I have not been able to refer satisfactorily to their proper place. Without notes or drawings, most of the fleshy Fungi are very difficult of investigation, and the results are rather approximative than exact. (Name, according to Dioscorides, from *Agaria*, a town in Sarmatia.)

1. Agaricus *phalloides*, Fr. *Syst. Myc. v.* 1. *p.* 13.
HAB. In woods, *Colenso.*

2. Agaricus *clypeolarius*, Bull. *t.* 405.
HAB. On the ground, *Colenso.*

3. Agaricus (Lepiota) *exstructus*, Berk.; pileo campanulato tessellato-verrucoso, epidermide lævi dehiscente apices verrucarum investiente, stipite subæquali sursum annulato, lamellis angustis remotissimis.
HAB. On the ground, Bay of Islands, *J. D. H.*

Pileus campanulate, carnose, 1 inch or more high, nearly 2 inches across, regularly broken up into strong warts, each of which is clothed at its apex with an angular portion of the smooth cuticle. *Stem* nearly equal, about 3 inches high, ¼ of an inch thick, not penetrating the substance of the pileus; ring superior. *Gills* narrow, extremely remote.—A very beautiful species, of which a single specimen only has been gathered.

4. Agaricus *brevipes*, Bull. *t.* 521. *f.* 2.
HAB. On the ground, *Colenso.*

5. Agaricus *infundibuliformis*, Schæff. *t.* 212.
HAB. On the ground, *Colenso.*

6. Agaricus (Omphalia) *Colensoi*, Berk.; pusillus, pileo tenui umbilicato glabro, margine involuto, stipite gracili furfuraceo glabrescente, lamellis adnato-decurrentibus.
HAB. On the ground, amongst sand and on scraps of wood, wet logs, etc., Ngaawapurua, *Colenso.*

White. *Pileus* ½ an inch or more across, smooth, minutely striate all over when dry, deeply umbilicate; margin involute. *Stem* ½–¾ of an inch high, not a line thick, attenuated downwards, furfuraceous, at length smooth. *Gills* moderately broad, adnato-decurrent.—The nearest ally of this species is probably *A. pyxidatus.*

7. Agaricus *umbelliferus*, L.
HAB. On the ground, *Colenso*; Bay of Islands, *J. D. H.*

Rather a slender form. This variable Fungus occurs in very different climates, and its varieties might easily be separated into a host of plausible species.

8. Agaricus (Pleurotus) *Novæ-Zelandiæ*, Berk.; hygrophanus, albus, pileo flabellato-reniformi vertice affixo postice scarioso-scabro tenui tenero, stipite obsoleto, lamellis latis distantibus, interstitiis venosis.

HAB. On dead wood, *Colenso*.

About $2\frac{1}{2}$ inches broad, $1\frac{1}{2}$ inch long, flabellate, reniform, fixed by the elongated vertex, which forms a little round disc, smooth in front, minutely scarioso-scabrous behind, thin, of a subgelatinous consistence. *Stem* obsolete. *Gills* broad, thin, distant; interstices venose.—A very curious species, somewhat allied to *A. versiformis*, from Ceylon.

9. Agaricus (Pleurotus) *cocciformis*, Berk.; minutus, pileo primum pezizæformi demum reflexo cervino dense piloso, stipite nullo, lamellis angustis pallide alutaceis setulosis.

HAB. On decorticated wood, Bay of Islands, *J. D. H.*

Pileus 1–2 lines broad, at first Pezizæform, then reflected, thickly clothed with fawn-coloured hairs, somewhat grooved. *Stem* none. *Gills* narrow, setulose, pale tan-coloured.

A very pretty and distinct little species, which may be compared with Montagne's *A. phalligerus*, but the antheridia are less strongly developed, and, unless I am mistaken, the spores are white.

* Agaricus *strophosus*, Fr.

HAB. On the ground in grassy spots, Wairarapa, *Colenso*. (A single specimen only.)

* Agaricus *erebius*, Fr.

HAB. On the ground in grassy spots, Ahuriri, *Colenso*.

Another closely allied species, but in too bad a condition to determine, occurred in a garden in the same locality.

10. Agaricus *adiposus*, Fr. *Ep. p.* 166.

HAB. On trees, forest near Cape Turnagain, *Colenso*.

Said to be eaten by the natives.

11. Agaricus sapineus, Fr. *Syst. Myc. v.* 1. *p.* 239.

HAB. On dead *Coniferæ*, *Colenso*.

12. Agaricus *campestris*, L.

HAB. On the ground, *Colenso*.

13. Agaricus *arvensis*, Schæff. *t.* 310, 311.

HAB. On the ground, *Colenso*.

14. Agaricus (Psalliota) *campigenus*, Berk.; minor, pileo campanulato subcarnoso squamuloso, stipite gracili, annulo latiusculo superiore deorsum incrassato, lamellis angustis postice attenuatis subadnatis.

HAB. On the ground, amongst grass, *Colenso*.

Pileus about 1 inch high, campanulate, very obtuse, silky, with a few scattered scales, assuming a reddish hue when dry, rather fleshy. *Stem* $1\frac{1}{2}$ inch high, about 2 lines thick, incrassated at the base, slightly furfuraceous, with a broadish ring near the top. *Gills* rather narrow, attenuated behind, adnexed or slightly adnate. *Spores* pale red-brown, obliquely obovate.

This has much the habit of a *Lepiota*, but the gills are adnexed and the spores pale, but decidedly coloured. It has not, I believe, been ascertained whether the spores of *Leucospori* ever change their colour when dry. In such species as *A. cretaceus* they are never dark. It is however certain that in *A. fumoso-purpureus*, Lasch., they are sometimes colourless, but possibly from being effete; and I have lately received from Dr. Badham *A. cretaceus* with spores decidedly white, though the gills are as pink as in any dark-spored specimens.

15. Agaricus *fascicularis*, Hudson.

HAB. On the ground, *Colenso*.

16. Agaricus (Hypholoma) *stuppeus*, Berk.; pileo carnoso convexo expanso squamis e pilis fasciculatis stuppeis strigoso, stipite basi incrassato fibrilloso, lamellis umbrinis adnexis.

HAB. On the ground, *Colenso*.

Pileus 2 inches or more broad, fleshy, convex, expanded, clothed, especially towards the margin, with towy fasciculato-fibrous scales. *Stem* $1\frac{1}{2}$ inch high, $\frac{1}{3}$ of an inch or more thick, fibrillose, incrassated at the base, and attached to the soil by abundant mycelium. *Gills* crowded, moderately broad, adnexed, umber.

Closely allied to *A. lacrymabundus* and *A. velutinus*, but distinguished by the abundant fascicles of fibres with which the pileus is clothed.

17. Agaricus *appendiculatus*, Bull. *t.* 392.

HAB. On decayed stumps, *Colenso*.

Gen. II. COPRINUS, *P.*

Hymenophorum a stipite discretum. *Lamellæ* membranaceæ, primum stipato-cohærentes, dein diffluentes.

Deliquescent Agarics, growing for the most part on dung, but sometimes on other decaying substances, whether animal or vegetable. Found in all parts of the world: but the tropical species do not exceed in beauty those of more temperate climates, and are often identical with them. (Name from κοπρος, *dung*.)

* Coprinus *Colensoi*, Berk.; pusillus, niveus, pileo e cylindrico subcampanulato furfuraceo, stipite gracili tomentoso, sporis minoribus.

HAB. On dung, *Colenso*, no. 5293.

Subfasciculate. *Pileus* scarcely exceeding a line in height, cylindrical, obtuse, at length subcampanulate, white, furfuraceous. *Stem* slender, $\frac{1}{4}$–$\frac{3}{4}$ inch high, tomentose. *Gills* linear. *Spores* oblong, $\frac{1}{3500}$ of an inch long.—Differs from *C. niveus* in its small size, and much smaller spores: those in *C. niveus*, at least in American specimens, are not less than $\frac{1}{2000}$ of an inch long.

Gen. III. MARASMIUS, *Fr.*

Hymenophorum a stipite cartilagineo l. corneo heterogeneum. *Lamellæ* nunc latæ, nunc plicæformes, acie acuta, valleculis contiguis.

A large and very pretty group, separated by Fries from *Agaricus*, on account of the coriaceous substance of the pileus, in consequence of which the species are easily preserved for the Herbarium. (Name from μαραινω, *to wither*.)

* Marasmius *caperatus*, Berk. *in Hook. Lond. J. Bot. Feb.* 1851.

HAB. On dead wood, Wairarapa, *Colenso*.

The specimens are unfortunately nearly destroyed by mites, but they seem to be the same with the Sikkim species.

Gen. IV. LENTINUS, *Fries.*

Coriaceus, l. carnoso-lentus. *Lamellæ* cum hymenophoro concretæ, discretæ (nec plicæformes), tenues, absque trama distincta; acie acuta, dentata, vel inciso-lacerata.

The species of this natural group are distinguished from *Agaricus* by their lacerated gills and tough persistent substance, in consequence of which they are easily preserved for the Herbarium; and therefore, while the fleshy Agarics

of tropical countries are for the most part neglected, these are often carefully preserved, and the more especially as many of them are extremely handsome.—They abound far more in warmer than less genial climates, and therefore are few in number in Europe and analogous countries. The species with entire gills are now separated, under the name of *Scleroma.* (Name from *lentus,* tough; in allusion to their tenacious substance.)

1. Lentinus *Novæ-Zelandiæ,* Berk.; minor, subimbricatus, pileo flabelliformi tenui rufo-badio postice velutino, lamellis angustis tenuibus pileo concoloribus.

HAB. On dead wood, *Colenso.*

Subimbricated. *Pileus* 1 inch or more long and broad, thin, flabelliform, suborbicular or reniform, bay-brown, clothed behind with short velvety olive down. *Stem* obsolete. *Gills* of the same colour as the pileus, narrow, decurrent behind; edge thin, lacerated.—Closely resembling *Lentinus castoreus,* of which I have an authentic specimen, but differing in size and in the narrow gills.

Gen. V. SCLEROMA, *Fries.*

Characteres *Lentini,* excepta acie lamellarum integra.

The species generally grow on the bare soil, binding it and the little stones it contains into a solid mass by their mycelium. They differ from *Panus* in the absence of a distinct trama. (Name from σκληρωμα, *hardness;* in contradistinction to the softer substance of *Agaricus.*)

1. Scleroma *pygmæum,* Berk.; parvum, pileo umbilicato tenui glabro striatulo, stipite gracili pulverulento radicante, lamellis subdistantibus longe decurrentibus interstitiis lævibus.

HAB. On wet decayed logs (April), forest at Tehawera, *Colenso.*

Dirty white. *Pileus* about 1 inch across, umbilicate, slightly striate, smooth, very thin. *Stem* 1–2 inches high, scarce a line thick, pulverulent, rooting, slightly rufous. *Gills* rather distant, decurrent; interstices even. —Smaller than any known species of the genus.

Gen. VI. PANUS, *Fries.*

Carnoso-coriaceus, tenax, arescens. *Lamellæ* perfectæ, tenaces, inæquales; acie acuta, integerrima; trama distincta, fibrosa, in hymenium radiante.

Distinguished from *Lentinus,* with which they agree in their persistent nature, by the tough, firmer, entire gills, and fibrous trama. (Name from *panus,* a web; in allusion to the nature of the trama.)

1. Panus *stypticus,* Fr. *Ep. p.* 399.

HAB. On dead wood, Ruamahanga River, *Colenso.*

The same species clearly as that which is so common in Europe, but with a deep vinous tinge in younger specimens.

2. Panus *maculatus,* Berk.; imbricatus, amplus, pileis reniformibus convexis carnosis primitus tomentosis demum glabris rimoso-squamosis, stipitibus connatis subobsoletis, lamellis latis subdistantibus integerrimis.

HAB. On dead trunks, *Colenso.*

Closely imbricated. *Pilei* reniform, convex, at first innato-tomentose, the cuticle cracking up into shortly reflexed scales, at length quite smooth; margin slightly involute. *Stems* connate, scarcely visible, except in young pilei. *Gills* rather distant, decurrent, broad, crisped when dry; margin quite entire. *Spores* white, oblong, with a lateral hilum $\frac{1}{3000}$ of an inch long.—This is a very distinct and beautiful species. The scales arise from the cracking of the cuticle, in consequence of which a slight portion is reflected in front, while that behind is not at all disturbed. The only species with which it can be compared is *P. areolatus,* Berk., a Ceylon species of a much smaller size, brightly coloured, and different in habit.

Gen. VII. SCHIZOPHYLLUM, *Fries.*

Aridus, excarnis. *Lamellæ* coriaceæ, ramoso-flabelliformes, acie longitudinaliter fissæ; lamellulis discretis, extrorsum revolutis.

Fungi of a very distinct habit, known at once from the gills splitting along the trama, and the divided portions become revolute. They abound in warm countries, but are comparatively scarce in temperate climates. In England they rarely if ever occur, except on imported timber. (Name from σχιζω, *to split*, and φυλλον, *a leaf.*)

1. Schizophyllum *commune*, Fr. *Ep. p.* 403.

Hab. On dead trees, extremely common, *Colenso, Lyall, Sinclair, Hooker, Bidwill.*

Gen. VIII. LENZITES, *Fries.*

Suberosus coriaceusve. *Lamellæ* coriaceæ, firmæ, nunc simplices inæquales, nunc ramosæ posticeque poroso-anastomosantes; trama pileo similari, floccosa; acie acuta.

This genus differs from other *Agaricini* in its hard coriaceous substance, which resembles that of *Dædalea*. The hymenium, however, presents the type of an Agaric, rather than of a *Polyporus*, as is very clear in well-developed specimens. *Agaricus ostreatus* does not cease to be an Agaric, because of its gills running into pores behind. (Named in honour of *Dr. H. O. Lenz*, the author of a useful work on esculent and poisonous Fungi.)

1. Lenzites *repanda*, Fr. *Ep. p.* 404.

Hab. On dead wood, Bay of Islands, *J. D. H.*

A triquetrous form, with a very *Dædaloid* appearance, but evidently somewhat modified by having accidentally been reversed during the process of growth, a circumstance which greatly affects many exotic Fungi.

Gen. IX. POLYPORUS, *Fries.*

Hymenophorum inter poros in tramam descendens, sed cum eisdem in stratum proprium seu discolor mutatum. *Pori* cum pilei substantia contigui, a se invicem haud separabiles, primitus obsoleti l. minutissimi, dein rotundi, angulati l. laceratione varii.

An enormous genus, of which a greater number of new species is daily turning up. Some are perfect cosmopolites, others very widely distributed, but many extremely local. Fries, in his 'Symbolæ,' lately published, divides the genus into two subgenera, *Eupolyporus* and *Fomes*, the first of which contains the annual species, the second the perennial. Many of the fleshy species are esculent, and some of the coriaceous forms when properly prepared yield the substance called Amadou. (Name from πολυς, *many*, and πορος, *a pore.*)

The genus *Boletus* has at least one representative in New Zealand, but the specimens received are in so bad a condition that I cannot determine the species.

1. Polyporus *arcularius*, Fr. *Ep. p.* 430.

Hab. On dead wood, as at Wairehama, *Sinclair, Colenso.*

2. Polyporus *oblectans*, Berk., *in Hook. Lond. Journ. v.* 4. *p.* 51.

Hab. On the ground, *Colenso.*

3. Polyporus (Pleuropus) *phlebophorus*, Berk.; parvus, candidus, pileo flabelliformi vertice in stipitem brevem porrecto glaberrimo venoso-undulato, cuticula e gelatinosa cartilaginea, poris minimis subirregularibus, dissepimentis tenuibus dentatis. (Tab. CV. Fig. 3.)

Hab. On a decaying log in a forest near Tehawera, *Colenso.*

About one inch broad and long, of a beautiful white. *Pileus* flabelliform, attached by the vertex, which is

elongated into a short stem, extremely smooth, marked with little waved furrows; cuticle cartilaginous and subtranslucent when dry. *Pores* very minute, just visible to the naked eye, irregular; dissepiments very thin, denticulated, sometimes tomentose.—A very distinct species, somewhat resembling *P. liturarius*, Berk. et Curt., gathered at the Feejee Islands by the American Antarctic Expedition, but more nearly allied to the subarctic species *P. obductus*, Berk.—PLATE CV. Fig. 3, *P. phlebophorus*, Berk., *natural size*.

4. Polyporus (Pleuropus) *xerophyllus*, Berk.; pileo flabellato suborbiculari radiato-rugoso scabriusculo, margine crenato, stipite brevi nigro ruguloso subtiliter velutino, hymenio pallido, poris parvis, acie obtusiuscula. (TAB. CV. Fig. 2.)

HAB. On dead wood, *Colenso*.

Pileus about one inch across, flabelliform, suborbicular, brown with a strong rufous tinge, marked with raised radiating lines, and many smaller wrinkles, very minutely scabrous; margin thin, crenate. *Stem* $\frac{1}{3}$ of an inch long, black, rugose, most minutely velvety. *Hymenium* nearly white. *Pores* just visible to the naked eye; dissepiments varying in thickness; edge generally rather obtuse.—A very neat little species, closely allied to *P. varius*, but more particularly to *P. grammocephalus*, from which however it differs in the rugged, differently coloured pileus.—PLATE CV. Fig. 2, *P. xerophyllus*, Berk., *natural size*.

5. Polyporus *lucidus*, Fr. *Ep. p.* 442.

HAB. On dead wood, *Colenso*.

6. Polyporus *sanguineus*, Fr. *Ep. p.* 444.

HAB. Bay of Islands, *J. D. H.*

7. Polyporus (Merisma) *Colensoi*, Berk.; ramosissimus, frequenter dichotomus, pileis parvis flabelliformibus lineatis glabris, poris elongatis, dissepimentis tenuibus, acie acutissima.

HAB. On trunks of trees in forests: Tehawera, *Colenso*.

Forming a mass more than a foot across; main stems slender, distinct, somewhat elongated, repeatedly dichotomous. *Pilei* extremely numerous, flabelliform, expanded, depressed above, brownish, smooth, or nearly so, with a few raised lines. *Pores* pale, often very much elongated, decurrent; dissepiments thin; edge extremely acute, often toothed, sublamellæform.—This is a noble species, and evidently differing from every form of *P. intybaceus* in its distinct dichotomous branches, and the constantly acute dissepiments. Some of the figures of *Hydnum coralloides* give a better idea of the ramification of the species than any of those of *P. frondosus*.

* Polyporus *adustus*, Fr. *Ep. p.* 456.

HAB. On dead wood, *Colenso*.

8. Polyporus *dichrous*, Fr. *Ep. p.* 457.

HAB. On dead wood, Tehawera, *Colenso, J. D. H.*

The specimens are more undulated than usual, but cannot be separated from the more ordinary form. *P. nigropurpurascens*, Schweinitz, scarcely differs.

9. Polyporus *tabacinus*, Mont. *Fl. I. Fern. no.* 15. *Fl. Chilena, v.* 7. *p.* 361.

HAB. On dead wood, *J. D. H., Colenso*.

10. Polyporus *isidioides*, Berk. *in Hook. Lond. J. Bot. v.* 2. *p.* 415.

HAB. Bay of Islands, *J. D. H.*

This is a common *Polyporus* in the southern hemisphere, and perhaps may prove eventually a subspecies of *P. scruposus*, Fr.

* Polyporus *scruposus*, Fr. *Ep. p.* 473.

HAB. On dead wood, *Colenso*. A resupinate form.

* Polyporus (Placodermei) *plebeius*, Berk.; pallidus, imbricatus, pileo dimidiato pulvinato subtiliter pubescente azono suberoso hymenio concavo, poris minutis punctiformibus, acie obtusa.

Var. *α*; margine acuto.

Var. *β*; margine obtuso.

Hab. On dead wood. Var. *α*. Himalayas. Var. *β*. New Zealand, *Colenso*.

Pale, imbricated, corky. *Pileus* 2 inches across, 1 inch long, dimidiate, pulvinate, zoneless, generally even, very minutely pubescent, rigid; substance zoneless. *Pores* minute, $\frac{1}{140}$ of an inch across, punctiform; edge obtuse. —A miniature likeness of *P. fraxineus*. The pileus is generally even, but sometimes there is a strong groove, and sometimes a few rugged elevations. In the New Zealand form, the older parts are more inclined to assume a spuriously laccate appearance. *P. vulneratus*, Lév., is closely allied, but thinner than either form, and blood-stained behind.

11. Polyporus *australis*, Fr. *Ep. p.* 464.

Hab. On dead wood, Bay of Islands, *J. D. H.*

* Polyporus *salicinus*, Fr.

Hab. On dead wood, Dusky Bay, *Menzies*, with *Hypoxylon annulatum*, as also from the Sandwich Islands.

12. Polyporus *igniarius*, Fr. *Ep. p.* 466.

Hab. On trunks of trees, Bay of Islands, *J. D. H.*

It does not seem to be generally known that the spores in this species are white, as also in *P. dryadeus*,—a certain distinction from *P. fomentarius* and some other species, in which they are of a dark ferruginous tint. The New Zealand specimen is clothed here and there with a delicate minute tawny velvety coat, but without exhibiting the characters of *P. fulvus*.

* Polyporus (Placodermei) *hemitephrus*, Berk.; pileo ungulæformi concentrice sulcato e fusco-purpureo cinerascente subtilissime tomentoso, contextu lignicolore, hymenio concavo albido, poris punctiformibus stratosis.

Hab. On trunks of trees, *Colenso*.

Pileus ungulate, with two or three deep furrows, most minutely tomentose, purplish-brown, becoming in parts cinereous; substance firm, corky, zoned, wood-coloured, tawny beneath the hardened cuticle. *Hymenium* concave, white. *Pores* punctiform, slightly stratose.—Combining the characters of *P. fomentarius* and *P. fraxineus*, but more nearly allied to the latter. I have seen only a portion of a specimen, and therefore do not give the dimensions, which are apparently those of the former species.

13. Polyporus *cinnabarinus*, Fr. *Ep. p.* 473.

Hab. On dead wood, *Colenso*; Bay of Islands, *J. D. H.*

14. Polyporus *hirsutus*, Fr. *Ep. p.* 477.

Hab. On dead wood, *Colenso*; Bay of Islands, *J. D. H.*

There is a resupinate state, as well as the ordinary form.

15. Polyporus *velutinus*, Fr. *Ep. p.* 478.

Hab. On dead wood of *Podocarpus*, *Colenso*.

The specimens are not in their normal state, but they approach nearer to *P. velutinus* than to any of the allied species, of all of which I have an immense series, from Fries.

16. Polyporus *versicolor*, Fr. *Ep. p.* 478.

Hab. On rotten logs in watercourses, as at Cape Kidnapper, Tehawera, etc., *Colenso*.

17. Polyporus (Inodermei) *catervatus*, Berk.; e resupinato liberatus, vertice demum elongato affixus, confluens, supra sericeo-striatus, poris minoribus irregularibus, dissepimentis tenuibus, acie denticulata. (Tab. CV. Fig. 1.)

Hab. On split stems of *Podocarpus spicata*, Mission Station, *Colenso.*

Forming dull white patches, consisting of very numerous, laterally confluent pilei, each of which is from $\frac{1}{4}$–$\frac{1}{2}$ an inch broad, and attached by the elongated vertex; above sericeo-striate; margin often lobed. *Hymenium* of the same colour as the pileus. *Pores* minute, irregular; dissepiments thin; edge acute, somewhat toothed.—Resembling in habit *P. concrescens*, but allied to the true *P. membranaceus*, Swartz. It is a very singular species.—Plate CV. Fig. 1. *P. catervatus*, Berk., *natural size.*

18. Polyporus (Resupinatus) *diffissus*, Berk.; carnosus, ruber, carne tandem divulsa, poris parvis, dissepimentis tenuibus, acie membranacea denticulata.

Hab. In the charred inside of a *Fagus, Colenso.*

Resupinate, effused, fleshy, of a bright red, at length tearing away from the matrix, and leaving part of the substance behind. *Pores* small; dissepiments thin; edge membranaceous, slightly toothed.—This is probably a resupinate form of some Anodermeous species, which has not at present been observed. Its bright colour, however, makes it very remarkable, on which account it is inserted here, though the specimen is by no means in a satisfactory state.

* Polyporus (Resupinatus) *leucoplacus*, Berk.; candidus, rigidiusculus, tenuis, limitatus, poris parvis punctiformibus, dissepimentis crassis, acie obtusissima pulverulenta.

Hab. On dead sticks, *Colenso.*

White, effused, but limited by an abrupt, free, narrow, nearly smooth border, thin, rather rigid. *Pores* punctiform, about $\frac{1}{100}$ of an inch broad; dissepiments thick, edge flattened, minutely pulverulent.—Distinguished from *P. medulla*, Panis, by its thin substance, and from *P. xantholoma*, Schwein., by the absence of any yellow tinge, especially as regards the margin.

19. Polyporus *vaporarius*, Fr. *Ep. p.* 487.

Hab. On dead wood, as in the forest beyond Tehawera, *Colenso.*

Gen. X. DÆDALEA, *Pers.*

Pori adulti labyrinthiformes l. lacerato-dentati. *Hymenophorum* inter poros omnino immutatum, in tramam cum pilei substantia persistenter similarem descendens.

Differing from *Polyporus*, not only in its sinuated pores, but in the nature of the trama. (Name from δαιδαλος, in allusion to the labyrinthiform pores.)

1. Dædalea *confragosa*, Fr. *Ep. p.* 493.

Hab. On dead wood, Bay of Islands, *J. D. H.*

Precisely the British species, as found at Bristol by Mr. Stephens.

2. Dædalea *pendula*, Berk.; imbricata, coriacea, pileis bursæformibus pendulis dorso verticeque affixis zonatis pallide gilvis, floccis rigidiusculis umbrinis breviter strigosis vestitis, hymenio lilacino-gilvo parce poroso, dissepimentis irregularibus. (Tab. CV. Fig. 4.)

Hab. On dead wood, Ngawakatatara, *Colenso.*

Imbricated, coriaceous. *Pilei* $1\frac{1}{2}$ inch broad, 1 inch long, pendulous, bursæform, pale reddish-grey, tinged with lilac, sparingly zoned, clothed with short, strigose, matted brown hairs; margin tomentose. *Hymenium* tinged with lilac and reddish-grey, sparingly porous, with irregular, tooth-like dissepiments, which are finely setulose.—This, if fully grown, is scarcely a *Dædalea* in its characters, having more the hymenium of a *Radulum;* but it is evidently

allied to such species as *D. unicolor;* and though the dissepiments are irregular, there are very evident pores, while in some parts there are as evident teeth. The species is at any rate undescribed, whatever may be thought of the genus.—PLATE CV. Fig. 4. *Dædalea pendula*, Berk., *natural size.*

Gen. XI. FAVOLUS, *Fries.*

Carnoso-lentus. *Hymenium* reticulatum, cellulosum, alveolatum. *Alveoli* radiantes, e lamellis dense anastomosantibus formati, elongati, parietibus duplicatis.

The species of this genus approach very near to such *Polypori* as *P. squamosus*, from which perhaps they are scarcely separable. The pores, however, in the allied *Polypori*, are minute at first, and then dilated; whereas those of *Favolus* are cellular from the beginning, resembling in fact those at the base of the gills of *Agaricus ostreatus.* (Name from *favus*, a honeycomb.)

1. Favolus *intestinalis*, Berk. *in Hook. Journ. Bot.* 1851, *p.* 167.

HAB. On dead wood amongst moss, *Colenso.*

Gen. XII. HYDNUM, *L.*

Hymenium in fungo horizontali inferum; aculeis inter se liberis, deorsum spectantibus.

A very important section of Fungi, comprising far the larger part of those whose hymenium is spread over elongated, more or less filiform or aculeiform processes. A few species are excellent when cooked, as for instance *Hydnum repandum*, which is scarcely inferior to *Tuber æstivum.* (Name from ὕδνον, *a fungus.*)

* Hydnum *clathroides*, Pallas.

HAB. On *Knightia excelsa*, in dense forests, Manawatu, *Colenso.* Native name, Pekepeke Riore.

Of this I have seen only a decayed fragment. The plant, when fresh, is said to be of "a light whitish-brown," and to attain a large size. Without further information I do not hesitate to consider it merely as a state of the species of *Pallas.*

1. Hydnum *scopinellum*, Berk.; effusum, albidum, subiculo intertexto, aculeis basi tomentosis, apice penicillato.

HAB. On dead wood, *Colenso.*

Widely effused; subiculum composed of delicate, interwoven threads, which make the base of the aculei tomentose, tips penicillate.—Allied to *H. ciliolatum*, Berk. et Curt., but the prickles are not flat, nor are they properly denticulate. A form occurs in which they are dwarf and badly developed.

Gen. XIII. IRPEX, *Fries.*

Hymenium inferum, primitus dentatum. *Dentes* varii, firmi, subcoriacei, acuti, cum pileo omnino concreti, seriatim l. reticulatim dispositi, basique plicis lamellosis (in sessilibus) porosisve (in resupinatis) concatenati.

Just intermediate between *Polyporus* and *Hydnum*, combining the characters of both genera. The tendency, however, is towards the former genus, though the teeth are very distinct. The species belong principally to temperate climates. (Name from *irpex*, a harrow; in allusion to the firm teeth of the hymenium.)

1. Irpex *brevis*, Berk.; subimbricata, brevis, dimidiata, mycelio expanso, pileo albo hic illic rufescente innato-fibrilloso, dentibus elongatis compressis dentatis.

HAB. On dead bark, Bay of Islands, *J. D. H.*

Loosely and distantly imbricated. *Mycelium* thin, running in little patches over the bark, from which spring dimidiate, somewhat pendulous pilei, scarcely half an inch long, and twice as much broad, which are at first white

and then variously tinted with red-brown, slightly rugose, sometimes zoned, innato-fibrillose. Very rarely the whole pileus is rufous. *Stem* none, but occasionally the vertex is slightly elongated. *Teeth* flat, elongated, often toothed. —The pileus is marked very much after the fashion of *Polyporus molliusculus.* I cannot point out any species to which it has a close affinity.

Gen. XIV. THELEPHORA, *Fries.*

Hymenium subinferum, cum pileo anodermeo fibroso-contexto connatum, costato-striatum papillosumve, carnoso-lentum, nigrescens, demum flocculoso-collabens.

The large groups of Fungi, characterized generally by the absence of any distinct folds or teeth, and their more or less coriaceous or fibrous substance, formerly associated under the common name of *Thelephora*, have been broken up into three principal genera: the first, *Thelephora*, comprising those which exhibit obscure folds and granulations on their hymenium, and having no distinct cuticle; the second, *Stereum*, those which have a cuticle combined with a coriaceous texture, and even hymenium; and the third, *Corticium*, those which are of a more fleshy, moist texture. The resupinate species are sometimes with difficulty assigned to their proper place, but the three divisions are certainly natural. They occur in all parts of the world, abounding in temperate climates, though a few are subtropical species. (Name from θηλη, *a pap*, and φερω, *I bear.*)

1. Thelephora *vaga*, Berk.; resupinata, mycelio repente byssoideo subreticulato, hymenio pulverulento isabellino.

Hab. On dead wood, *Sinclair.*

Mycelium creeping widely over the wood, in the form of arachnoid, somewhat reticulated, byssoid strings. *Hymenium* pulverulent, but not setulose, pale clay-coloured.—Resembling somewhat *Corticium velutinum*, but differing in colour and structure.

2. Thelephora *pedicellata,* Schwein. *in Schrift. d. Nat. t.* 2. *f.* 3.

Hab. On bark amongst moss, *Colenso;* Bay of Islands, *J. D. H.*

This very curious species resembles some of the puzzling anamorphoses of Lichens, which are constantly transmitted as Fungi. I have not seen authentic specimens of Schweinitz' plant, but the New Zealand fungus accords so exactly with the figure and description, that I have no doubt about its identity.

Gen. XV. STEREUM, *Fries.*

Hymenium definite terram spectans, coriaceum, sat crassum, cum strato intermedio pilei dermatini concretum, læve, semper immutatum et contiguum, persistens.

The finer species of this genus are mostly tropical, but some of the commoner forms, as *Stereum hirsutum*, occur in every latitude. Several have the hymenium velvety, with short bristly hairs. These form a distinct group, and are separated generically by Léveillé, under the name of *Leptochæte.* (Name from στερεος, *stiff.*)

1. Stereum *Sowerbeii*, Berk.—Helvella pannosa, *Sow. t.* 155.

Hab. On the ground, *Colenso.*

This species occurs also in Van Diemen's Land. I have authentic specimens of the plant of Sowerby, and have found the species myself, and can positively assert that the hymenium is not setulose, as expressed in Persoon's figure, and described by Fries. The species, in fact, approaches near to *Stereum elegans*, and differs in having a dull not shining pileus, which is more or less marked with raised lines, and is often proliferous at the margin. I see no difference between the European and New Zealand specimens: in both, the stem is sometimes central, but frequently lateral or merismoid. The figure in Sowerby gives no notion of the colour, which, instead of being dull, exhibits bright shades of red-brown. I have no authentic specimen of the plant of Fries, but his cannot be the same with that of Sowerby.

2. Stereum *lobatum*, Kze. *in Weig. Exs.*

HAB. On dead wood, Bay of Islands, *J. D. H., etc.*

The specimens exactly accord with authentic *S. Boryanum*, Fr., which I consider certainly the same species with *S. lobatum*.

3. Stereum *cinereo-badium*, Fr. *Ep. p.* 547. *Klotzsch, Nov. Act. v.* 19. *t.* 5. Thelephora badia, *Hook. Bot. Misc. v.* 2. *t.* 84.

HAB. On dead wood, *Colenso, etc.*

4. Stereum *vellereum*, Berk.; resupinato-ambiens, margine demum late libero lobato, sursum stuppeo-strigosum versus marginem zonatum, hymenio ochraceo lævi.

HAB. On dead twigs, *Colenso*. Middle Island, *Lyall.*

Spreading for several inches over dead twigs, which it half surrounds, but at length becoming free, with a broad lobed border; above dirty white, except towards the zoned margin, where it assumes an ochraceous tinge, clothed behind with rather coarse, tow-like fibres, those on the younger portion, with which the extreme edge is ciliated, being finer. *Hymenium* even, ochraceous.—This species is nearly allied to *Stereum striatum*, but is distinguished by its coarse coat. It is a very pretty Fungus, though perhaps scarcely sufficiently distinct from the North American species.

5. Stereum *hirsutum*, Fr. *Ep. p.* 549.

HAB. On dead wood, Bay of Islands, *J. D. H.*

6. Stereum *phæum*, Berk.; pileo dimidiato sessili tenui coriaceo-flexili zonato breviter hirto subvelutino badio, hymenio pileo conformiter sulcato setuloso ferrugineo.

HAB. On dead wood, Bay of Islands, *J. D. H.*

Pileus 1½–2 inches broad, 1 inch or more long, dark bay, variegated with paler zones, clothed with short, matted hairs, thin, but rather coriaceous, dimidiate, sessile. *Hymenium* zoned like the pileus, bay, with a ferruginous bloom, setulose.—A very beautiful species, without the slightest yellow or rhubarb tint. It resembles *S. rubiginosum*, but is far more freely developed, and very different in texture.

* Stereum *rugosum*, Fr. *Ep. p.* 552.

HAB. On dead wood, *Colenso.*

A coarse, rigid form, with a distinct, zoned, velvety pileus.

7. Stereum *papyrinum*, Mont. *Cuba, p.* 374.

HAB. On dead wood, *Colenso.*

Thelephora crassa, Lév., is scarcely a different species, though thicker and with a free margin.

8. Stereum *latissimum*, Berk.; longe lateque effusum, candidum, sub lente minutissime subtomentosum, margine abrupto.

HAB. On bark of trees, *Sinclair.*

Forming patches many inches in length and breadth, very thin, following all the inequalities of the matrix, chalk-white, under the lens very minutely subtomentose; margin abrupt, by no means byssoid.—Resembling *Stereum acerinum*, but a thinner, more effused plant. It appears to grow on living branches, but is certainly no Lichen, as it is without gonidia.

Gen. XVI. CORTICIUM, *Fries.*

Hymenium amphigenum; vegetum et fertile tumens, carnoso-molle, udum, undulatum papillosumve, siccitate collabens, lævigatum, sæpissime rimoso-incisum sed nunquam flocculoso-deliquescens.

Those species with true asci, such as *Corticium Marianum* (which is nothing more than *Peziza confluens*), must be excluded; and those which remain, which are truly sporophorous, as *C. giganteum*, will be known from their allies by their softer hymenium.—Specimens imperfectly developed do not exhibit the characters of the genus, which is very much confined to temperate regions. (Name from *cortex*, bark; from the habitat of many of the species.)

1. Corticium *læve*, Fr. *Ep. p.* 560.

HAB. On little twigs, dead bark, etc., Tehawera, *Colenso.*

2. Corticium *viride*, Berk.; effusum, crustaceum, rimosum, olivaceo-viride, margine tenuissimo livido, sporis magnis subglobosis.

HAB. On dead decorticated wood, and also on bark, *Colenso.*

Effused, forming small, confluent patches of a yellow olivaceous green, with a very thin, membranous, scarcely byssoid, livid margin. *Hymenium* cracked. *Spores* subglobose or elliptic, large, $\frac{1}{1750}$ of an inch long.—Analogous to *Hydnum viride*. When old it acquires a darker tinge.

3. Corticium *terreum*, Berk.; resupinatum, terreo-fuscum, subvinosum, primo continuum, dein areolato-rimosum, setulosum, margine angustissimo.

HAB. On bark of *Knightia*, Ruamahange, *Colenso.*

Effused, resupinate; at first even, earthy brown, with a vinous tint, then cracked into areolæ, setulose; margin extremely narrow, not distinctly byssoid; the areolæ sometimes acquire a very narrow but distinctly defined border.—Very nearly allied to *C. cinnamomeum*, but certainly distinct. The colour is something like that of *Thelephora laciniata*.

4. Corticium *polygonium*, Fr. *Ep. p.* 564.

HAB. On dead bark, *Colenso.*

The specimens are of a rich red-brown, and are more highly developed than any I have seen, with the exception of one received from M. Lindblad, which confirms the diagnosis above given, about which I should otherwise have had some doubt.

5. Corticium *rhabarbarinum*, Berk.; effusum, resupinatum, flavo-ferrugineum, margine subtiliter byssino, hymenio setuloso continuo.

HAB. On bark, *Colenso.*

At first exhibiting little round specks, which gradually increase, and form a uniform, tawny stratum; margin rather paler, delicately and shortly byssoid. *Hymenium* even, not cracked when dry, distinctly setulose.—This is undoubtedly allied to *C. cinnamomeum* and *C. corrugatum*, but the hymenium is never cracked, and the colour approaches to that of rhubarb. The true *C. cinnamomeum*, a differently coloured and much thicker species, may be seen in Madame Libert's collection, no. 122.

Gen. XVII. CYPHELLA, *Fries.*

Submembranaceus, postice adnatus, subporrectus, pendulus. *Hymenium* definite inferum, sed similare et nullo modo a pileo discretum, persistens, demum inæquabile.

This genus includes a few Pezizæform Fungi, which were formerly associated with *Peziza*, but are at once distinguished by the absence of asci. Their peculiar habit prevents the probability of confusion with *Stereum*, to which they are most nearly allied. (Name from κυφος, *leaning forwards;* from their pendulous habit.)

1. Cyphella *densa*, Berk.; parva, cæspitosa, e vertice obliquo porrecto pendula, cervina, supra pubescenti-pruinosa, hymenio concolore lævi.

HAB. On living bark of *Corynocarpus lævigata*, Cape Kidnapper, *Colenso.*

Forming little distinct patches, consisting of numerous fasciculate, pendulous, pruinose, elongated, fawn-coloured bodies, attached by their apex. *Hymenium* of the same colour, even. *Spores* elliptic, $\frac{1}{3000}$ of an inch long.—The meal with which the pilei are clothed consists of short, obtuse flocci.—This species has many of the characters of *Cyphella pendula*, but that is a far larger species. *C. Gayana*, Lév., is much larger and not fasciculate, in which latter character it agrees with *C. fasciculata*, Berk. et Curt., though very different in other respects. *C. cupulæformis*, Berk. et Rav., differs in its solitary habit, form, and dark hymenium.

Gen. XVIII. GUEPINIA, *Fries.*

Gelatinosa, subtremellina, intumescens, sicca contrahitur, subcartilaginea. *Hymenium* distinctum, definite inferum vel primitus superum, immutatum, persistens.

Intermediate between *Tremellini* and *Auricularini.* The species are for the most part very beautiful and interesting, the finest, however, occurring in Europe and South Carolina. (Named after *Guepin*, a French Botanist.)

1. Guepinia *spathularia,* Fr. *Ep. p.* 566.
HAB. Springing from the cracks of a decayed log, Pahiatua, *Colenso.*

2. Guepinia *pezizæformis,* Berk. *in Hook. Lond. J. Bot. v.* 4. *p.* 60.
HAB. On dead wood, Bay of Islands, *J. D. H.*

Gen. XIX. HYPOCHNUS, *Fries.*

Plano-expansus, membranaceus, sed totus e floccis fibrosis contextus. *Hymenium* pruinosum. *Sporæ* conglobatæ, normaliter floccis obvolutæ.

An ill defined genus, the structure of which is not at present perfectly understood. It is not improbable that the species, some of which are very common in tropical regions, are anamorphoses of Lichens. (Name from ὑπο, *under*, and αχνη, or χνοος, *down.*)

1. Hypochnus *albo-cinctus,* Mont. *Cub. p.* 368.
HAB. On dead bark, Bay of Islands, *J. D. H.*

Probably a degeneration of some Lichen.

Gen. XX. CLAVARIA, *L.*

Carnosa, ramosa l. simplex, teres, absque stipite distincto; hymenio contiguo sicco.

A large genus, very widely distributed, more especially in temperate regions. Many of the species are excellent articles of food. Fungi of a similar form occur in other groups, but those of the present genus are at once distinguishable by the exposed hymenium producing naked spores. (Name from *clava*, a club.)

1. Clavaria *lutea,* Vitt. *Mang. t.* 29. *f.* 3.
HAB. On the ground, *Bidwill.*

The specimens exactly resemble Vittadini's figure. All the allied species are excellent when stewed.

2. Clavaria *pusio,* Berk.; stipite gracili sursum crassiore ad basin ipsam in ramos paucos adscendentes acutos diviso.
HAB. On the naked soil, *Colenso.*

About ½ an inch high. *Stem* not a line thick, rather incrassated above, divided into a few acute, cylindrical, ascending branches, about as long as the stem, making an acute angle with each other, and rarely subdivided.—This species has nearly the same appearance as *C. chondroides*, which it much resembles, but differently branched, and

on a smaller scale. The colour of the dried plant is rufous. As no notes accompanied the specimen, I cannot tell what was the original colour. The habit is somewhat that of *C. macropus*.

3. Clavaria *flagelliformis*, Berk.; ramosissima, ad basin ipsam divisa, ramis subfasciculatis fastigiatis cylindricis elongatis furcatis acutis apice indivisis.

HAB. On the bare soil, Bay of Islands, *J. D. H.*

About 2 inches high, divided to the base; branches beginning to spread about half an inch from the base, forming a somewhat fastigiate, flagelliform mass, cylindrical, forked, elongated, acute and undivided at the apex.—A much larger plant than the last, to which it is nearly allied; unfortunately there are no notes as to colour. The dried plant, like the last, is rufous and somewhat translucent above.

4. Clavaria *arborescens*, Berk.; sparsa, amethystina, gracilis, stipite tenui elongato simplici, ramis furcatis fastigiatis ultimis brevissimis acutis.

HAB. On the ground, Wangarei and Bay of Islands (October), *Colenso*.

About 2 inches high, scattered, elegant. *Stem* flexuose, simple, 1 inch high, slightly incrassated upwards, spreading into a few forked branches, which bear a quantity of fastigiate ramuli, the ultimate divisions being extremely short and rather acute. This is clearly allied to the two foregoing, and like them can be referred to no published species, though with the habit of *C. macropus*. The colours are evidently bright when fresh. A very distinct form of this species occurs at the Bay of Islands, with a very different habit, nearly half an inch high, and far more robust in proportion; it is branched to the base, and is more compact. Without a series of specimens, it is impossible to say which is the more typical.

5. Clavaria *flaccida*, Fr. *Syst. Myc. v.* 1. *p.* 471.

HAB. On dead leaves, twigs, etc., *Colenso*.

* Clavaria *crispula*, Fr. *Ep. p.* 576.

HAB. On rotten wood, *Colenso*.

6. Clavaria *Colensoi*, Berk.; parva, e basi compressa ramosa, ramis erectis furcatis subæqualibus apicibus acuminatis, fibrillis brevibus stupposis matrici affixa.

HAB. On decayed wood, *Colenso*.

About 1 inch high, attached to the soft decayed wood by a few short towy fibres, which, like the whole plant, are brown when dry. *Stem* mostly compressed, branched from the base, or a little above it, repeatedly forked; branches subfastigiate, delicate; apices forked, very acute. Closely allied to *C. delicata*, but the brown fibres by which it is attached, and other points, forbid its association with that species, of which I have authentic specimens from Fries.

7. Clavaria *inæqualis*, Fr. *Syst. v.* 1. *p.* 481.

HAB. On the ground, Bay of Islands, *Hooker*.

Gen. XXI. PISTILLARIA, *Fries*.

Clavata, e ceraceo rigens, contextu vesiculoso.

Minute epiphytous *Clavariæ*, from the smaller species of which genus they differ very slightly. (Name from *pistillum*, in allusion to their form.)

* Pistillaria *ovata*, Fr. *Ep. p.* 537.

HAB. On dead stalks of herbaceous plants, *Colenso*.

Gen. XXII. EXIDIA, *Fries.*

Gelatinosa, tremula, submarginata, contextu rare floccoso, subtus sterilis, heteroplaca, supra rugosa, callo hymenino, papillis heterogeneis consperso tecta; sporis curvulis.

This genus approaches much more nearly to *Auricularini* than other Tremellaceous Fungi, and indeed is almost identical with *Auricularia*. Almost all the species are hispid underneath, though a splendid but small vermilion-coloured species from New York is an exception. *E. Auricula-Judæ* is common in all parts of the world, and one or two very close allies abound in the tropics. The common species was used in medicine, but it is doubtful whether it has any active properties. (Name from *exsudo*, to ooze out.)

1. Exidia *hispidula*, Berk. *in Ann. of Nat. Hist. v.* 3. *p.* 396.

HAB. On stems of trees hanging over water, Lake Mawe, Bay of Islands, River Wangaehu, on *Corynocarpus*, etc., *Ross, Colenso, J. D. H.*

Gen. XXIII. SECOTIUM, *Kze.*

Volva universalis, demum margine pilei rupta. *Pileus* stipitatus. *Hymenium* cellulosum, cellulis labyrinthiformibus persistentibus.

This curious genus combines the characters of *Boletus* and *Hymenangium*. The hymenium is sometimes distinct, as in *Boletus*, but, in individuals of the same species, occupies besides a place above the insertion of the stem. The species, which are as yet few in number, prefer the warmer temperate regions. One as yet undescribed affords a delicious article of food in Australia. A minute species has occurred in the south of Europe. If *Lycoperdon transversarium*, Bosc., is to be considered as a true *Secotium*, the characters must be slightly modified, as the volva in that species is indehiscent. (Name from σηκος, an enclosure).

1. Secotium *erythrocephalum*, Tul., *Ann. des Sc. Nat.* 1844. *Aug. p.* 115. *Sep.* 1845. *t.* 9. *f.* 5–17.

HAB. On the ground, Northern Island, *Sinclair.* Banks' Peninsula, *Raoul.*

Distinguished by its beautiful red obtuse pileus.

Gen. XXIV. ASEROE, *Labill.*

Volva globosa, intus gelatinosa. *Receptaculum* stipitatum, in radios longos subulatos sæpe furcatos divisum. *Hymenium* basi radiorum positum.

This beautiful genus occurs not only in New Zealand and Australia, but also in Ceylon; and if *Calathiscus*, Mont., be considered also a species, as connected with the older forms by that from Ceylon, in India. Like other *Phalli*, the species emit a very disagreeable smell, which is scarcely compensated by their beauty. (Name from ασηρος, disagreeable.)

1. Aseroe *rubra*, Labill.

HAB. On the ground, Auckland, *Sinclair.*

Varying in size and in the number of the rays; but these are always continuous with the stem, and not divided behind by a deep groove, as in the following species.

* Aseroe *Hookeri*, Berk.; minor, stipite transversim rugoso a receptaculo omnino discreto, radiis subtus sulco divisis, laciniis longissimis. *α.* miniata. *β.* viridis. (TAB. CV. Fig. 13.)

HAB. On clay banks or hills, as at Kai Patika, *J. D. H., Colenso.*

A much smaller species than the last, with a transversely rugose stem, and very long rays, which are strongly grooved behind. The colour is sometimes of a more or less deep red, sometimes of a metallic green. The latter form was fully described and figured in Hook. Lond. Journ. vol. iii. p. 192; but other specimens have now been re-

ceived resembling *Aseroe rubra* in colour, though exactly agreeing in other respects; I have consequently been obliged to alter the specific name.—PLATE CV. Fig. 13:—*a.* Section of a young *Aseroe Hookeri* magnified: the hymenium forms a spongy, tender mass, connected with the rays up to the point of their bifurcation, by a little light-coloured, tendinous substance, which is given off from the centre: this is at length absorbed, and there is then a perforation from the centre to the cavity of the stem. *b.* A transverse section below the point of bifurcation, showing the mass bulging out between each ray. *c.* Spores, which are rather smaller than those of *A. rubra*, magnified 250 diameters.

Gen. XXV. ILEODICTYON, *Tul.*

Volva universalis, globosa, intus gelatinosa. *Receptaculum* sessile, cancellatum, ramis late fistulosis nequaquam porosis ilia mentientibus. *Hymenium* retis parieti interno adhærens.

This genus was very properly separated by M. Tulasne from *Clathrus*, on account of the hollow branches of the network, which are besides not porous, as in that genus. The species, as at present known, are nearly confined to Australia and New Zealand; *I. gracile*, however, occurs in Chili. (Name from ειλεος, *an intestine*, and δικτυον, *a net.*)

1. Ileodictyon *cibarium*, Tul., *Ann. des Sc. Nat.* 1844. *Aug. p.* 114.

HAB. On the ground, *Raoul, Colenso, Sinclair, etc.*

The volva was formerly eaten by the natives when they were in less favourable circumstances than at present, and was known under the name of *Paru watitiri* (Thunder-dirt). The smaller species has not yet occurred in New Zealand.

Gen. XXVI. PAUROCOTYLIS, *Berk.*

Peridium simplex, durum, tenue; gleba floccosa, sinubus paucis magnis flexuosis percursa, sporas magnas globosas pedicellatas e superficie proferentibus.—Genus Lycoperdineum *Arachnio* affine, *Glomo* quodam modo quod ad sporas attinet analogon. (Name from παυρος, *few,* and κοτυλη, *a cavity.*)

1. Paurocotylis *pila*, Berk. (TAB. CV. Fig. 9.)

HAB. On the ground, Tehawera, *Colenso.*

Globose, slightly sinuated, bright crimson, somewhat rufous, and much contracted and waved when dry. *Peridium* hard, thin, rigid, consisting of flocci closely laced into a compact network; trama floccose to the naked eye, but under a high power consisting of loose, interwoven, membranous bodies, which give rise on the surface of the sinuses, which are very few in number, to pellucid peduncles, of greater or less length, each of which bears a large globose spore $\frac{1}{1250}$ of an inch in diameter, whose endochrome contains a small globose nucleus. The spores, when seen together on the walls of the fructifying cavity, are of a pale tan-colour.—This is one of the most singular species in the collection, but unfortunately only a solitary specimen has at present occurred. The characters are, however, too striking to leave much room for hesitation. The Fungus looks at first like a young dried egg of some Phalloid.—PLATE CV. Fig. 9:—*Paurocotylis pila, natural size;* (the colour changes, when dry, to a dull pale rufous.) *a.* Portion of tissue and sporidia, *magnified.* *b.* Sporidia *in situ, magnified* 250 *diameters.* It is probable that in the fresh plant there are asci, as in *Stephensia;* if so, the peduncles are merely the base of the withered asci.

Gen. XXVII. GEASTER, *Mich.*

Peridium duplex; exterius discretum, persistens, radiis stellatis expansis dehiscens.

Puff-balls, varying greatly in size, and at once distinguished by their distinct outer peridium, which splits in a stellate manner, and turns back, so as to present a very striking appearance. They occur in almost all parts of the world, where Fungal growth is possible. (Name from γη, *the earth,* and αστηρ, *a star.*)

* Geaster *fimbriatus,* Fr. *Syst. v.* 3. *p.* 16.

HAB. On the ground, *Colenso.*

Gen. XXVIII. TRICHOSCYTALE, *Corda.*

Peridium externum suberoso-ligneum, rugosum; internum floccosum, externum demum superans, fimbriatum.

A very curious genus, first figured by Junghuhn, from Java. It has occurred also in Sikkim, and in South Carolina,—in the latter instance on some species of *Laurus.* Though at first sight extremely anomalous, a section at once shows its affinity with *Geaster.* (Name from *θριξ, a hair,* and *σκυταλη, a club;* published originally under the name of *Trichocoma,* which is pre-occupied by a genus of *Asteraceæ.*)

1. Trichoscytale *paradoxa,* Corda, *Anleitung, p.* 196.—Trichocoma paradoxum, *Jungh.*

HAB. On dead wood, Bay of Islands, *J. D. H.*

Gen. XXIX. BOVISTA, *Dill.*

Peridium papyraceum, persistens, cortice discreto, demum secedente. *Capillitium* subcompactum, æquale, peridio undique adnatum; sporis inspersis, pedicellatis.

Distinguished from *Lycoperdon* by its distinct outer peridium, which is, in typical species, nearly even, and ultimately shells off. The species are few in number, the individuals of which abound in exposed pastures under a temperate sun. One or two, at present imperfectly understood, occur in the tropics. (Name Latinized from the German *Bofist,* a puff-ball.)

1. Bovista *brunnea,* n. s.; globosa, peridio papyraceo-flexili brunneolo, cortice innato omnino evanescente, capillitio sporisque pallide argillaceo-olivaceis.

HAB. On the ground, amongst Moss, in grassy spots, head of Manawatu River, *Colenso.*

Globose, 1 inch across, attached by a central point, opening by a narrow aperture; outer peridium subinnate, at length entirely evanescent; inner brownish-umber. *Capillitium* and globose pedunculate spores subolivaceous.—This appears to be quite a distinct species from *B. plumbea,* which it resembles in the spores and in outward form, but not in colour, nor in the nature of the outer peridium.

Gen. XXX. LYCOPERDON, *Tourn.*

Peridium membranaceum, flaccescens, aut superne evanescens, cortice adnato, subpersistente, in squamas l. verrucas varias abeunte. *Capillitium* molle, densum, basi compacta, sterili peridioque adnatum.

Few Fungi are more widely dispersed or abundant than the species of this genus, which occur under varied forms in every climate. It is possible, however, that many very distinct kinds are confounded under one name, as the genus has never been studied monographically. Most of them, when young, are excellent for food, and the gigantic *L. Bovista* is the best of all Fungi. (Name from *λυκος, a wolf,* and *περδω,* in allusion to the ancient notion as to their origin.)

1. Lycoperdon *Fontanesii,* D. R. et Lév., *Fl. Alg. t.* 22.

HAB. On the ground, Waihekeh, *Colenso.*

This splendid Puff-ball resembles so closely the Algerian species, of which I have an exolete specimen, exactly in the condition in which it is represented by Desfontaines, that I am unable to find any characters by which it may be separated; it has the same turbinate form, the same areolate peridium, with depressed stellate warts occupying the areolæ, the same mode of rupture, minute sessile spores $\frac{1}{6000}$ of an inch long, and the same forked flocci. Like that also, it maintains for a long time its firm base, after the spores are dispersed, when it assumes a reddish tint. It sometimes weighs from one to three pounds. The natives roast and eat it, under the name of Pukurau.

2. Lycoperdon *cælatum*, Fr. *Syst. v.* 3. *p.* 32.

Hab. On the ground, *Colenso.*

3. Lycoperdon *pusillum*, Fr. *Symb. Gast. p.* 7.

Hab. On the ground, *Colenso.*

4. Lycoperdon *reticulatum*, n. s.; globosum, deorsum attenuatum, peridio subtiliter reticulato demum glaberrimo.

Hab. On the ground, *Colenso.*

An inch or more in diameter, globose, attenuated below into a very short stem, which sends down a rather firm root, finely reticulated, at length quite smooth and shining, opening above by a small, terminal, irregular orifice. *Capillitium* olivaceous, at length bleached, and of a very pale French grey. Barren stratum confluent with the capillitium. *Spores* globose, about the size of those of *L. pusillum*, from which it seems to be really distinct.

5. Lycoperdon *Novæ-Zelandiæ*, Lév.; receptaculo globoso sessili papyraceo, cortice albo nitente verruculoso secedente obtuso subtus plicato-lacunoso, parenchymate sporisque violaceis.—*Lév. in Ann. des Sc. Nat.* 1846 (*March*), *p.* 164.

Hab. On the ground, *Raoul.*

The above characters are copied from Léveillé. I have seen no specimens of this species. It is described as thin and very fragile, covered with a white bark, sprinkled with little granulæform warts. It opens with a very wide aperture; the capillitium is of a beautiful violet, as are also the spores, which are very small and even. The species seems to resemble *Bovista fragilis*, Vittadini.

6. Lycoperdon *microspermum*, Berk. *in Kew Misc.* 1851, *p.* 172.

Hab. On the ground, *Colenso.*

The specimens are intermediate between the New Zealand *L. pusillum*, and the Sikkim-Himalayan *L. microspermum*, resembling, however, in habit and sculpture the latter, but with rather larger spores, which are also of a greener tint, but this latter point depends much on age and circumstances.

7. Lycoperdon *gemmatum*, Fr. *Syst. Myc. v.* 3. *p.* 36.

Hab. On the ground, as at the forest near Tehawera, *Colenso.*

8. Lycoperdon *pyriforme*, Schæff.

Hab. On decayed wet wood, Wairarupa, *Colenso.*

Some specimens are almost sessile, but they have the columella characteristic of *L. pyriforme.*

Gen. XXXI. SCLERODERMA, *Pers.*

Peridium firmum, innato-corticatum, irregulariter dehiscens. *Flocci* peridio undique adnati, vacuolis immixtis minutis, in quibus glomeruli sporarum apicibus floccorum oriundarum absque peridiolo nidulantur.

The hard peridium and masses of naked spores separated by the reticulated capillitium, easily distinguish this genus. When young the species are very firm, and, as they sometimes grow beneath the surface of the soil, are often taken for Truffles, from which they differ altogether in structure. The species are for the most part very generally diffused. (Name from σκληρος, *hard*, and δερμα, *skin.*)

1. Scleroderma *Geaster*, Fr. *Syst. Myc. v.* 3. *p.* 46.

Hab. On the ground, Bay of Islands, *J. D. H.*

A single specimen only. It is very common in Australia.

2. Scleroderma *vulgare*, Fr. *Syst. Myc. v.* 3. *p.* 46.

Hab. On the ground, *Colenso.*

Gen. XXXII. ÆTHALIUM, *Lk.*

Peridium indeterminatum, membranoso-cellulare, fragile, fatiscens, extus strato floccoso evanescente corticatum, intus e floccis in strata membranacea coalitis cellulosum.

The only species of this genus, which is the pest of hothouses, occurs under various forms in various situations. How far it may be right to combine them all is doubtful, without a comparative examination of their fruit, which has not at present been made. (Name from αιθαλη, *soot.*)

1. Æthalium *septicum*, Fr. *Syst. Myc. v.* 3. *p.* 93.

HAB. On various substances, as dead wood, moss, etc., *Colenso.*

Gen. XXXIII. DIDERMA, *Pers.*

Peridium duplex: exterius crustaceum, discretum, glabrum, fragile, dehiscens: interius tenerrimum, membranaceum, evanescens. *Flocci* vagi, versus basin adnati, aut sæpius columellæ affixi interque sporas compactas serpentes, raro latentes.

The minuter exotic Fungi, especially those which scarcely bear transmission, have for the most part been little examined, and therefore much cannot be said about their distribution. The smooth, polished outer peridium sufficiently distinguishes the genus from any with which it can be confounded. Few objects are more beautiful when in perfection. (Name from δις, *double,* and δερμα, *a skin.*)

1. Diderma *Hookeri,* Berk.; rufum, stipite brevi crasso sursum angustiore, peridio globoso sursum evanescente deorsum subcircumscisso interiore tenerrimo hyalino, exteriore membranaceo, capillitio subhyalino, sporis atris sub lente vinosis. (TAB. CV. Fig. 12.)

HAB. On fronds of *Hymenophyllum,* in woods of the interior of the Northern Island, *Colenso.*

About a line high including the stem, rufous, with a slight iridescent lustre. *Stem* about equal in length to the globose peridium, thick, attenuated upwards, slightly veined. *Peridium* evanescent above, persistent at the base; outer membranous, subplicate; inner extremely delicate, nearly colourless; columella obtuse, about half the length of the stem, like which it is slightly veined, dark rufous. *Capillitium* attached to the columella and inner membrane, branched with broad, triangular spaces or lacunæ. *Spores* globose or polyhedrous, about $\frac{1}{1750}$ of an inch in diameter, black when seen in a mass, vinous under the lens.—This species resembles a *Physarum* in its outer membrane, but there is a strong columella, and a distinct inner membrane, visible only on dissection, to which the capillitium is attached. The inner membrane is certainly not composed of fibres, but that is rather the case with the outer membrane, as also with the base of the stem.—PLATE CV. Fig. 12. *Diderma Hookeri, natural size. a, b,* the same, *magnified. c.* Portion of the double coat, and the annexed threads. *d.* Spores, *magnified* 250 *diameters.*

Gen. XXXIV. DIDYMIUM, *Schrad.*

Peridium membranaceum, tenue, irregulariter dehiscens aut fatiscens, tectum cortice (peridio externo non discreto) adnato in squamulas furfuraceas aut villum farinosum mox fatiscente. *Flocci* vagi, peridio adnati, inter sporas serpentes.

The mealy peridium distinguishes this genus, which is of much more frequent occurrence than the former. It contains many very elegant species. (Name from διδυμος, *double.*)

1. Didymium *australe,* Berk.; peridio subgloboso fragili farinaceo, stipite brevissimo nigrescente, columella pallida, floccis crispis, sporis majoribus atris.

HAB. On the under side of leaves of *Lomaria Colensoi,* Colenso.

Minute, fixed by a thin, pale hypothallus. *Stem* extremely short, nearly black, even. *Peridium* subglobose,

farinaceous, brittle, not umbilicate, black and persistent when rubbed. *Flocci* much branched, strongly crisped, so as sometimes to appear spiral. *Spores* globose, black to the eye, purplish under the microscope, $\frac{1}{2750}$ of an inch long.—This species differs from *D. farinaceum* in its thicker, crisped flocci, and larger spores. Those in *D. farinaceum* I find $\frac{1}{3500}$ of an inch long, while the flocci are nearly straight and very slender.

2. Didymium *cinereum*, Fr. *Syst. v.* 3. *p.* 126.

Hab. On the naked soil, *Colenso.*

The specimens vary from adnato-confluent to stipitate, in which case there is a close approach to *D. costatum.* The spores are about $\frac{1}{2000}$ of an inch long, as I find them also in South Carolina specimens, which are exceedingly crowded, and have a white central mass, assuming somewhat the appearance of a columella. The little white specks which are so conspicuous amongst the dark spores, consist of solid, variously-shaped bodies, from the angles of which are given off in some cases delicate white threads, in others membranous expansions, meeting similar offsets from neighbouring bodies.

Gen. XXXV. STEMONITIS, *Gled.*

Peridium simplex, tenuissimum, membranaceum, fugax, evanescens. *Capillitium* determinatum, stipite (nigro) intrante adnatum; floccis reticulatim connexis.

The peculiar habit and penetrating stem in most cases indicate clearly the species, a few of which approach *Physarum.* *S. fusca*, and one or two more, occur in all parts of the world, if indeed all the forms usually referred to that species really belong to it. It is represented, as at present appears, in New Zealand, by *S. ferruginea*, which bears a close external resemblance to it. (Name from στημων, *a thread*, or *stamen.*)

1. Stemonitis *ferruginea*, Ehrenb. *Sylv. Ber. p.* 26. *f.* 6. A. B.

Hab. On dead wood, *Colenso.*

2. Stemonitis *typhoides*, DC. *Fl. Fr. v.* 2. *p.* 257.

Hab. On a decayed *Polyporus*, Hawke's Bay, *Colenso.*

Spores $\frac{1}{3250}$, whereas those of *S. fusca* are not less than $\frac{1}{2250}$. The specimens are nearly intermediate between *S. ferruginea* and *S. typhoides*, resembling the latter in characters, and the former in general aspect.

Gen. XXXVI. CYATHUS, *Pers.*

Peridium primum obovatum vel fusiforme, obtusum, apice demum centrali dehiscens, et velo candido tympani instar clausum, e membranis tribus arcte invicem applicatis compositum. *Sporangia* plana, umbilicata, funiculo parietibus addicta. *Sporæ* sporophoro innatæ.

A most curious genus, attracting the notice of every observer, from its resemblance to little nests full of eggs. It occurs in all parts of the world; and while some of the species are cosmopolites, others are purely tropical. It is distinguished from *Crucibulum* by the structure of the peridium. The mode of growth of the spores has been happily indicated by M. Tulasne, as being like that of the higher *Hymenomycetes.* (Name from *cyathus*, a cup.)

1. Cyathus *Novæ-Zelandiæ*, Tul. *in Ann. des Sc. Nat. Ser.* 2. 1844. *Jan. p.* 66. *t.* 6. *f.* 1–5.

Hab. On decayed wood, Banks' Peninsula, *Raoul.*

This species is fully described by Tulasne in the place quoted above. I have seen no specimens.

* Cyathus *Colensoi*, Berk.; condensatus, tenuis, papyraceus, estriatus, furfuraceo-sericeus, tunica sporangiorum crassa, sporis minimis ovoideis.

Hab. On the ground in Mr. Colenso's garden.

Densely crowded, cyathiform, ¼ of an inch high, pale dirty umber, thin and flexible, clothed with short, branny pubescence, which does not, however, form distinct scales; even within, and brownish, without any trace of striæ.

Sporangia 1 line or more in diameter, irregular, brown; coat thick. *Spores* ovoid, scarcely ever attenuated, $\frac{1}{3250}$ of an inch long. This species is allied to *C. microspermus*, but has larger spores, and the habit of *C. vernicosus*.

Gen. XXXVII. CRUCIBULUM, *Tulasne.*

Peridium primum globosum, tandem crucibuliforme, et epiphragmate plano, concolore, furfuraceo, cyathi marginibus extremis continuo clausum; textura fibroso-spongiosa, homogenea, nec e stratis parallele oppositis distinctis constans, ore admodum nudo absque ulla corona limbari. *Sporangia* subtus sphærula tegumenti fibrosa contigua prædita.

There are but two species of this genus, one of which occurs all over Europe, the north of Africa, and in North America. (Name from *crucibulum*, a crucible.)

1. Crucibulum *vulgare*, Tul. *l. c. p.* 90.

Hab. On twigs, etc., Ahuriri, Ruamahanga, *Colenso, Raoul;* Bay of Islands, *J. D. H.*

Another fine *Crucibulum*, which appears to be the same with a species from the Himalayas, to which I have given the name of *C. Emodense*, was found on wood at Nelson (Mr. D. Monro). Unfortunately there are no sporangia, so that I cannot speak positively about the species.

Gen. XXXVIII. LEPTOSTROMA, *Fries.*

Perithecium tenue, planum, demum circumscissum; sporis minimis, sporophoris suffultis.

Obscure Fungi, consisting of depressed, irregular, or orbicular perithecia, which easily fall off, leaving behind the thin lower half, which is perfectly adnate with the matrix. Exotic species have been little studied; some are probably merely the second form of certain *Sphæriæ*. (Name from λεπτον, *a mite,* and στρωμα, *a stratum.*)

1. Leptostroma *litigiosum*, Desm. *Exs. no.* 1327.—Var. *exasperatum.*

Hab. On dead stems of ferns.

Some individuals exactly resemble the plant of Desmazières, while others are strongly granulated. In the absence of fruit, it is best to consider the two as merely forms of the same species.

Gen. XXXIX. PHOMA, *Fries.*

Perithecia immersa, minuta, subglobosa. *Sporæ* minutissimæ, subellipticæ, ut plurimum utrinque nucleatæ, sporophoris brevibus suffultæ.

Black specks of extremely simple structure. Many of the species are undoubtedly merely spermogonia. (Name from φωμα, *a pustule.*)

1. Phoma *fallax*, Berk.; peritheciis subglobosis fuscis supra translucidis, sporis oblongis subcymbiformibus hyalinis.

Hab. On the fruit of *Ripogonum parviflorum*, Bay of Islands, *J. D. H.*

Consisting of scattered or crowded minute dots, black when dry, brown when moist, thin and transparent above, so as to appear like tiny discs. *Spores* oblong, subcymbiform, hyaline, $\frac{1}{1750}$ of an inch long.

2. Phoma *acmella*, Berk.; epidermide brunneola tecta, peritheciis depressis, sporis variis oblongis utrinque leviter attenuatis. (Tab. CVI. Fig. 10.)

Hab. On the same leaf with *Sphæria acetabulum*, of which perhaps it is only a form.

On both sides of the leaf, but especially on the upper; indicated by little brownish spots, which are darker in the centre, or, when the cuticle is cracked over the perithecia, lighter. *Perithecia* depressed. *Spores* about $\frac{1}{3250}$ of

an inch long, oblong, slightly attenuated at either end, but by no means acute.—PLATE CVI. Fig. 10. Spores of *Phoma acmella, magnified* 250 *diameters.*

Gen. XL. HENDERSONIA, *Berk.*

Perithecia subglobosa. *Sporæ* sporophoris suffultæ, majores pluriseptatæ.

Very pretty microscopical objects, of which doubtless a portion, like many *Diplodiæ*, are spermogonia. They vary greatly in the nature of their spores; but those species only should be admitted which have many endochromes. (Named after *Mr. J. Henderson*, the talented gardener of Earl Fitzwilliam.)

1. Hendersonia *hyalospora*, Berk.; peritheciis punctiformibus nitidis subastomis, sporis linearibus brevibus hyalinis triseptatis. (TAB. CVI. Fig. 8.)

HAB. On bark of *Olea*, Tehawera, *Colenso.*

Forming minute specks, scattered over the bark. *Perithecia* black, shining, sometimes slightly papillate, but generally without any trace of an ostiolum. *Spores* $\frac{1}{1250}$ of an inch long, linear, obtuse at either end, hyaline, triseptate. When out of the proper focus, the articulations seem divided into two or three smaller portions.—PLATE CVI. Fig. 8. *a.* Spores of *Hendersonia hyalospora*, Berk., *magnified* 250 *diameters*. *b.* Single spore, *more highly magnified.*

Gen. XLI. ASCHERSONIA, *Mont.*

Stroma carnosum; cellulæ periphericæ. *Sporæ* sporophoris oriundæ, septatæ l. simplices.

Little, fleshy, yellowish, superficial Fungi, growing on living leaves, and exactly analogous to *Hypocrea*. (Named after *F. M. Ascherson*, author of some valuable treatises on Fungi.)

* Aschersonia *duplex*, Berk.; flava, rubiformis l. simplex, cellulis majoribus minoribusque, sporis oblongis angustis.

HAB. On leaves of *Astelia, Colenso.*

Stroma $\frac{1}{4}$–1 line or more broad, convex, yellow, lobed like a raspberry; *cells* varying greatly in size. *Spores* oblong, hyaline, $\frac{1}{3500}$ of an inch long. *Ostiolum* umbilicate, or very obscure.—Occasionally the stroma is convex, and not at all lobed or compound, in which case it contains only a single large cell; the lobes, on the contrary, often contain several cells.

Gen. XLII. PHLYCTÆNA, *Desm.*

Perithecium spurium, convexum, ab epidermide nigrefacta formatum, poro pertusum. *Nucleus* gelatinosus. *Sporophoræ* brevissimæ. *Sporæ* curvatæ, elongatæ vel fusiformes, dein ejectæ.

The spurious perithecium and elongated spores are the characteristics of this genus, which was proposed only in 1847. (Name from φλυκταινα, *a pustule.*)

1. Phlyctæna *dissepta*, Berk.; linea nigra geographica cincta, sporis tenuissimis elongatis filiformibus apice curvis. (TAB. CVI. Fig. 14.)

HAB. On the same stems with *Pemphidium opacum.*

Patches from a line to half an inch long, surrounded by a flexuous, irregular black line; spots scattered, very variable in appearance, sometimes colourless, sometimes with a black line or speck in the centre, and sometimes surrounded with a black line. *Sporophores* filiform; *spores* about $\frac{1}{600}$ of an inch long, filiform, strongly curved at the apex.—It is possible that this may be the sporophorous form of the *Pemphidium*, but at present it would be premature to form any decided opinion on the subject.—PLATE CVI. Fig. 14. Spores and sporophores of *Phlyctæna dissepta, magnified* 250 *diameters.*

Gen. XLIII. PILIDIUM, *Kze.*

Perithecia primum lenta, subcollabentia. *Sporæ* lineares, curvæ, simplices, inarticulatæ, sporophoris innatæ.

This genus is separated from *Septoria*, principally by its tough flat perithecium. Though the habit is peculiar, the separation is perhaps scarcely tenable, for all the species are not ruptured by lines radiating from the centre. (Name from πιλιδιον, *a little pileus.*)

* Pilidium *Coriariæ*, Berk.; peritheciis subrigidis demum centro perforatis, sporis curvulis linearibus utrinque subattenuatis.

Hab. On dead leaves of *Coriaria sarmentosa, Colenso.*

Perithecia black, rather rigid, seldom collapsed, at length perforated. *Spores* linear, slightly curved, obscurely attenuated at either end, $\frac{1}{1500}$ of an inch long.—The spores are one-third longer than in *P. myrtinum*, Mont., and the rigid perithecia are also distinctive.

Gen. XLIV. PUCCINIA, *P.*

Sporæ in soros congestæ, epidermidem rumpentes, e mycelio enatæ, endochromatibus duobus repletæ.

The ravages committed by *P. Graminis*, or mildew, give this genus, which abounds in species, an unpleasant notoriety. The species, doubtless, require reduction very much. They occur in all climates; *P. Graminis*, for instance, is found wherever the more common cereals are cultivated. (Named after *Thomas Puccini*, a Professor of Anatomy at Florence. Micheli's *Puccinia* is not, however, the same genus, but synonymous with *Podisoma.*)

1. Puccinia *compacta*, Berk.; maculis orbicularibus pallidis, soris depressis solitariis congestisque, sporis compactis oblongis argillaceis stipitibus longissimis.

Hab. On the under surface of the leaves of *Myosotis capitata*, Southern Island, *Lyall.*

Spots orbicular, of various sizes, pale. *Sori* solitary, and then very large, but sometimes scattered or surrounded with a ring of smaller sori, depressed, girt with the cuticle; mass of spores spongy, and extremely compact. *Stems* long. *Spores* $\frac{1}{500}$–$\frac{1}{400}$ of an inch long, elongated, subapiculate, often seated obliquely; nucleus distinct.—A very distinct species, remarkable for its very compact mass of spores, which do not easily separate from the matrix.

* Puccinia *Graminis*, DC.

Hab. On *Triticum rigidum*, with *Ustilago bullata;* one or two sori only, *Colenso.*

Gen. XLV. UROMYCES, *Lév.*

Receptaculum e cellulis parvis, irregularibus, vix distinctis formatum. *Sporæ* simplices, pedicellatæ.

Léveillé has divided this large genus with considerable skill, one of the divisions of which is here adopted. The species occur in all parts of the world. In *Uredo* the spores are never pedicellate, but spring from cells piled one above another; and in *Trichobasis* they are deciduous, leaving the receptacle bristling with the little stalks. (Name from *uro*, to burn, and μυκης, *a fungus*, and if so, scarcely formed legitimately.)

1. Uromyces *scariosa*, Berk.; hypophylla, soris distinctis epidermide persistente cinctis, sporis obovatis echinulatis pallescentibus, receptaculo prominulo.

Hab. On leaves of *Geranium potentilloides*, and *G. dissectum*, Hawke's Bay, *Colenso.*

Hypophyllous, scattered, distinct. *Sori* surrounded with the persistent cuticle. *Receptacle* prominent. *Spores* obovate, minutely echinulate, pale when dry, $\frac{1}{750}$ of an inch long.—Very distinct from *Uromyces Geranii*, which has globose, darker spores, and a far less decided receptacle. The spores in the dried plant are evidently bleached, but they probably were of a more or less brown tint.

Gen. XLVI. USTILAGO, *Lk.*

Receptaculum effusum, e cellulis minimis irregularibus compositum. *Sporæ* minores, simplices, pulveraceæ.

The species of this genus do not form in general distinct specks, as in most *Uredines*, but occupy the whole of the part of the plant on which they grow, or, if sori are present, they are more or less elongated, and occur only in *Gramineæ*. Almost all of them are very dusty and disagreeable to handle. The species are found in all climates. (Name from *ustus*, burnt.)

1. Ustilago *Candollei:* var. *a. Berkeleyana*, Tulasne, *Ann. des Sc.* 1847. *v.* 7. *p.* 94.

HAB. On the inflorescence of *Polygonum prostratum*, Mangatawiri, near Waikato, *Colenso*.

2. Ustilago *endotricha*, Berk.; soris magnis circumfusis aterrimis ipso pedunculo oriundis, sporis fibris crispis immixtis subglobosis lævibus minutissime granulatis. (TAB. CVI. Fig. 4.)

HAB. On the peduncles of the panicles of *Gahnia*, Auckland, *Sinclair*.

Forming ellipsoidal bodies an inch long, arising from the peduncle, but leaving the central tissue nearly sound, consisting of a mass of curled filaments, derived probably from the spiral vessels, but traversed by abundant mycelium, from the threads of which, either terminally or otherwise, spring abundant spores, at first pyriform, with frequently a distinct apiculus, and perfectly smooth, but gradually becoming darker and at length very minutely granulated, extremely variable in size: some are less than $\frac{1}{3000}$ of an inch long, while others exceed $\frac{1}{2000}$. The abundant mycelium of this species is very remarkable, as also the mode of origination of the spores. I have a closely allied species on some *Carex*, allied to *C. Indica*, from Ceylon, in which the fibres are so abundant, that it looks like an *Elachistea*.—PLATE CVI. Fig. 4. *Ustilago endotricha, natural size. a.* Section of *U. endotricha*, showing the pale axis, and radiating hairs, *magnified. b, c.* Hairs, which consist of the tissues of the plant, and exhibit mycelium and young spores, *more highly magnified. d.* A group of young spores, *magnified* 250 *diameters. e, e.* Spores separated from the mycelium, *magnified to the same degree.*

3. Ustilago *bullata*, Berk.; soris bullatis rachidem glumasque deformantibus, sporis subglobosis amplis. (TAB. CVI. Fig. 12.)

HAB. On *Triticum scabrum*, *Raoul*, *Colenso*.

Forming bullate, black spots on the glumes, rachis, and other parts of the inflorescence, which are sometimes greatly elongated. *Spores* subglobose, but irregular, even or only very obscurely rough, $\frac{1}{3500}$ of an inch in diameter; nucleus pale. A few vesicular threads are mixed with the spores, evidently arising from the altered tissue of the matrix.—A very distinct species, with the habit of *U. Pompholygodes*. It is nearest perhaps to *U. Salveii*, but differs in habit and in the even smaller spores, which have not the same tendency to become obovate. In *U. Salveii* the spores are about $\frac{1}{2500}$ of an inch long, and are evidently echinulate. Tulasne considers it only a form of *U. carbo*, var. *a. vulgaris*.—PLATE CV. Fig. 12. *Ustilago bullata, natural size. a.* Spores, *magnified* 250 *diameters.*

Gen. XLVII. ÆCIDIUM, *Gmel.*

Sporæ concatenatæ, in soros congestæ, peridio membranaceo demum lacerato-aperto cinctæ.

A vast genus, distinguished by its beautiful membranous peridium, which sometimes acquires a considerable length. The species are found principally in temperate regions. Some are very destructive to the plants on which they grow. (Name from *αικιον, a wheal* or *stripe*, and *ειδω, I resemble.*)

1. Æcidium *Ranunculacearum*, DC., *Fl. Fr. v.* 6. *p.* 97.

HAB. On leaves of *Ranunculus rivularis*, Esparaima, *Colenso*.

2. Æcidium *monocystis*, Berk.; peridiis solitariis magnis, margine irregulari subelongato, sporis pallidis. (TAB. CV. Fig. 15.)

Hab. On the tips of the leaves of *Forstera clavigera*, *Colenso.*

Peridia large, solitary, seated near the tips of the leaves on the upper side, persistent, surrounded by a strong wall arising from the tissues of the matrix, somewhat toothed and elongated. *Spores* pale, subglobose or slightly oblong, $\frac{1}{850}$ of an inch long, pale orange. A very singular and well-marked species.—Plate CV. Fig. 15. *Æcidium monocystis, natural size. a*, portion of peridium; *b*, spores:—*magnified* 250 *diameters.*

Gen. XLVIII. GYMNOSPORIUM, *Corda.*

Sporæ superficiales, conglobatæ, simplices; episporio glabro; stromate evoluto nullo.

Minute pulverulent Fungi, forming a thin stratum on vegetable substances. Some of the species approach to *Ustilago*, but are distinguished by their free mode of growth. (Name from γυμνος, *naked*, and σπορα, *seed.*)

* Gymnosporium *culmigenum*, Berk.; aterrimum, soriforme, sporis subglobosis, episporio tenui.

Hab. On dead grasses, *Colenso.*

Soriform spots, a line or more long, half as much broad, deep black. *Spores* subglobose or subelliptic, $\frac{1}{3000}$ of an inch long.

Gen. XLIX. PILACRE, *Fries.*

Peridium capitatum; supra membranaceum, tenerrimum, fatiscens. *Sporæ* subglobosæ, in strato supero peripherico coacervatæ.

This genus has just the habit of *Onygena*, but the fructification is very different. The morphosis is rather that of *Isaria* than of the *Trichogastres*, and therefore it is placed here in *Hyphomycetes*, rather than in *Gasteromycetes.* (Name from πιλος, *a hat*, and ακρον, *the top of anything.*)

1. Pilacre *divisa*, Berk.; capitulo globoso argillaceo, stipite diviso fusco, floccis rectis.

Hab. On bark, *Colenso.*

Stem 2–3 lines high, compressed below, and somewhat creeping, subfasciculate, brown, paler, and tomentose when young, forked above. *Heads* globose, argillaceous. *Spores* subglobose, $\frac{1}{5000}$ of an inch long, sometimes elliptic; *endochrome* distinct.—Allied to *P. faginea*, but more dingy in colour, and branched; the flocci also are less flexuous.

Gen. L. STILBUM, *Tode.*

Stipes solidus, contiguus, capitulo gelatinoso-flexili terminatus. *Sporæ* minutæ. *Capitulum* facile deciduum.

Atractium is distinguished from this genus by its fusiform, septate spores. If habit alone were considered, the two genera ought certainly to be combined; but as there is no reason to believe that the subglobose spores are in any case merely accessory, it seems imperative to keep the two distinct. Two or three highly-coloured species abound in the tropics, and occasionally occur in more temperate regions; most of the species however are extra-tropical. (Name from στιλβη, *brilliancy.*)

1. Stilbum *lateritium*, Berk. *in Ann. of Nat. Hist. v.* 4. *p.* 291. *t.* 8. *f.* 2.

Hab. On dead branches still covered with the bark, Middle Island, *Lyall, Bidwill.*

In Mr. Colenso's collections there is a Fungus exactly resembling the scattered shields of some *Biatora;* there is however no trace of crust, neither does the disc contain asci. The absence of spores forbids its being united to *Tubercularia.* It is probable that its true place is with neither of these genera, but that it is a *Corticium*, allied to *C. polygonium.*

Gen. LI. EPICOCCUM, *Lk.*

Receptaculum cellulosum, pulvinatum, raro basi fibrillosum. *Sporæ* magnæ, subglobosæ, periphericæ.

The species of this genus form little raised specks, often surrounded by a coloured halo. The spores, which are sometimes compound, spring from the surface of the cellular receptacle, so as to give the appearance of pins stuck into a cushion. All the species hitherto discovered are found in temperate climates. (Name from επι, *upon*, and κοκκος, *a grain*.)

1. Epicoccum *pallescens*, Berk.; primum epidermide tectum, sporidochio depresso cervino-fusco margine radiante brevi fibrilloso, sporis subturbinatis cellulosis pallidis breviter pedicellatis. (Tab. CV. Fig. 14.)

Hab. On dead leaves of *Earine*, Tararua, *Colenso*.

Forming minute fawn-coloured specks, which are at first closely covered by the epidermis. *Sporidochia* consisting of two or three strata, each projecting beyond the other, the lowest forming a fimbriated margin. *Spores* pale fawn-coloured, turbinate, cellulose, supported by a short hyaline peduncle, each containing a distinct nucleus.—Differing from all the other species, in its being produced beneath the cuticle, the nature of its sporidochium, and the pale spores.—Plate CV. Fig. 14. *Epicoccum pallescens, natural size*. *a*. Ditto, *magnified*. *b*, young spores; *c*, mature spores:—*magnified* 250 *diameters*.

Gen. LII. ŒDEMIUM, *Lk*.

Flocci rigidi, opaci, ad latera protrudentes sporas magnas globosas ut plurimum reticulatas.

The species of this genus have the appearance of black felt. It is distinguished from other genera of a similar habit, by its large lateral spores, which resemble the fruit of *Antennaria*. Indeed if these bodies be regarded as compound, the genera should be placed together; but as the point is uncertain, I leave the genus where it is placed by Fries. (Name from οιδημα, *a swelling*.)

1. Œdemium *robustum*, Berk.; floccis rigidissimis erectis sursum ramosis, ramis sæpe incurvis submoniliformibus.

Hab. On bark of *Hedycarya*, *Corynocarpus lævigata*, *etc*., East Coast, near Bare Island, *Colenso*.

Forming a black, shaggy stratum, consisting of thick ($\frac{1}{666}$ of an inch), erect bristles, which bear above a few slightly divided curved branches, paler than the stem, and whose articulations are more or less swollen. The base of the flocci is often rough with a few creeping threads. *Sporangia* subglobose.—This, like other species of the genus, is not well defined, in consequence of the difficulty of meeting with specimens in perfection. It is, however, remarkable for its thick threads and mostly incurved branches, which will make it easy to recognize, and perhaps may cause the transmission of better specimens. Its threads have frequently the vinous tint which is so remarkable in other species. Sometimes they are divided dichotomously above, two or three times, before they bear the paler curved ramuli.

Gen. LIII. MACROSPORIUM, *Fries*.

Sporæ erectæ, stipitatæ, multiseptatæ, opacæ, e floccis tenellis demum evanescentibus oriundæ.

The habit is almost that of *Cladosporium*, but the flocci are altogether subordinate, almost the whole plant consisting of large, more or less clavate, multiseptate spores. Exotic forms have at present been little studied. (Name from μακρος, *long*, and σπειρω, *I sow*.)

1. Macrosporium *obtusum*, Berk.; sporis brevibus pauci-articulatis obtusis, nucleis magnis.

Hab. On the ostiola of *Hypoxylon tuberiforme*.

Forming a thin olivaceous coat on the prominent ostiola. *Flocci* obsolete. *Spores* $\frac{1}{750}$ of an inch long, clavate, very obtuse, 4–5-articulate, with a large globose nucleus in each endochrome.—This species comes the nearest to *M. punctiforme*, Berk., but the articulations are more regular, without any vertical or oblique septa.

Gen. LIV. SEPEDONIUM, *Lk.*

Flocci teneri. *Sporæ* apicales magnæ, globosæ. *Mucedines* fungis putrescentibus enatæ.

The fleshy Fungi, especially *Boleti*, are often destroyed by the species of this genus, their substance being completely traversed by the mycelium, which produces myriads of spores externally. The mycelium is extremely abundant, and sometimes forms a sort of floccose veil to the mass of fruit. (Name from σηπομαι, *to corrupt;* in allusion to their place of growth.)

1. Sepedonium *chrysospermum*, Fr. *Syst. Myc. v.* 3. *p.* 438.

Hab. On a decayed *Boletus*, Bay of Islands, *J. D. H.*

The *Boletus* is in so bad a condition, in consequence of the ravages of the parasite, that I cannot determine it. The spores are short, and indicate the group to which *B. bovinus* belongs; but while in that species they do not exceed $\frac{1}{3500}$, in this they are about $\frac{1}{3000}$ of an inch long.

Gen. LVI. GEOGLOSSUM, *Pers.*

Carnosum, simplex, clavæforme, stipitatum. *Hymenium* clavam ambiens. *Asci* elongati.

Fungi with the habit of the simple *Clavariæ*, or rather of some species of *Hypoxylon*. They are in fact inverted *Pezizæ*, with the under surface of the cup entirely obliterated. They are, altogether, plants of mild regions, as far as is at present known. (Name from γη, *the earth*, and γλωσση, *a tongue.*)

1. Geoglossum *hirsutum*, Pers.

Hab. On the ground, *Colenso.*

Gen. LVI. PEZIZA, *Dill.*

Receptaculum carnosum vel subcarnosum, marginatum, cupulæforme, primo subclausum, mox expansum. *Hymenium* persistens. *Asci* ampli, distincti, fixi, sporas elastice ejiciendas includentes, paraphysibus immixtis.

A vast genus, occurring in every sort of situation and in every climate, but more especially in temperate regions. The cup-shaped receptacle, which is of a more or less fleshy nature, makes them in general easily recognized. *Cyphella* is known by its naked spores. Other Fungi of similar habit, but approaching Lichens and *Sphæriæ*, are comprised in separate genera. (Name from *Pezica*, a term used by Pliny for stemless Fungi.)

1. Peziza *miltina*, Berk.; cupula applanata coccinea margine tantum subtus pallidiore libera, ascis linearibus, sporidiis globosis.

Hab. On the bare ground, amongst moss, on hills, Hawke's Bay, *Colenso.*

Cup depressed, expanded, $\frac{1}{8}$ of an inch or more across, rather irregular, crimson, fixed to the soil by the whole under surface, with the exception of the margin, which is paler beneath. *Asci* linear; sporidia globose, $\frac{1}{1750}$ of an inch in diameter; nucleus single.—Resembling in general habit and colour *P. rutilans*, but that has elliptic sporidia, with two nuclei, unless indeed the little orange *Peziza*, which is so common on mud walls, be confounded with that species. The spores are larger than in the closely allied *P. endocarpoides*. *P. sphæroplea*, Berk. et Curt., has similar spores, but evidently differs in its articulate flocci.

2. Peziza *endocarpoides*, Berk.; cupula irregulari concava vel demum convexa expansa spadicea sessili, sporidiis globosis. (Tab. CV. Fig. 8.)

Hab. On the ground amongst moss and fern, Mission Station, *Colenso.*

Cup $\frac{1}{3}$ of an inch across, sessile, but fixed by a central floccose mass, with the margin free, concave, but at length convex and expanded, so as to resemble a little *Endocarpon*, obscurely floccose externally. *Asci* cylindrical,

containing eight globose sporidia, with a single large nucleus in each.—A curious species, resembling in its fructification *P. sphæroplea.* Its nearest allies are such species as *P. rutilans.*—PLATE CV. Fig. 8. *a.* Ascus of *Peziza endocarpoides*, Berk., with its sporidia *magnified*. *b.* Single sporidium, *magnified* 250 *diameters.*

3. Peziza *rhytidia,* Berk.; fuliginea, cupula subsessili hemisphærica incisa extus subtiliter innato-fibrillosa undato-rugosa, carne olivacea, hymenio polito, sporidiis oblongo-ellipticis. (TAB. CV. Fig. 6.)

HAB. On the ground, Bay of Islands, *J. D. H.* Banks of Kawatau in the interior, *Colenso.*

An inch or more in diameter, fuliginous. *Cup* subhemispherical, nearly sessile, deeply incised; margin narrow, inflected; external coat distinctly wrinkled, consisting of netted, brownish, innate fibres, to which succeeds a greenish stratum consisting of delicate threads, then a more compact layer, to which finally succeeds a thin paler stratum, from which the elongated asci and slender paraphyses immediately spring, the whole somewhat resembling the section given by Persoon of *P. purpurascens,* in 'Mycologia Europæa.' *Sporidia* oblong, elliptic, subcymbiform, $\frac{1}{1250}$ of an inch long.—Allied to *P. fuliginea* and *P. purpurescens,* but artificially referable to the subgenus *Encœlia,* on account of its innate fibrous outer coat; besides which it is evidently rather tough when fresh. It is fixed to the ground by a few dark penetrating threads. It may be observed that *P. craterium,* Schweinitz, to which it has some apparent affinity, differs in the structure of the hymenium.—PLATE CV. Fig. 6. *a, a. Peziza rhytidia,* Berk., *natural size.* *b.* Section, *slightly magnified.* *c.* Portion of outer coat, *more highly magnified.* *d.* Asci and paraphyses. *e.* Sporidium, *magnified* 250 *diameters.*

* Peziza *campylospora,* Berk.; fuliginea, cupula breviter stipitata obliqua extus rugosa subtiliter fibrillosa, carne albida, sporidiis majoribus oblongis curvatis.

HAB. On decayed wood, *Colenso.*

Cup above an inch across, oblique, lobed, wrinkled externally, and clothed with inconspicuous myceloid flocci. *Stem* short, wrinkled. *Hymenium* fuliginous, like the cup tinged with vinous-red; substance nearly white, composed of intricate threads. *Asci* linear. *Sporidia* oblong, strongly curved, $\frac{1}{750}$ of an inch long; paraphyses slender, very slightly incrassated above.—Allied to the last, but distinguished at once by the larger curved sporidia, its different habitat, etc.

4. Peziza *stercorea,* Fr. *Syst. v.* 2. *p.* 87.

HAB. On horse-dung, *Colenso.*

5. Peziza *Kerguelensis,* Berk. *in Hook. Ant. Voy. Crypt. p.* 145. *t.* 164. *f.* 3.

HAB. On the ground, Bay of Islands, *J. D. H.*

The specimens differ from those from Kerguelen's Land in their shorter, inarticulate hairs, but I see no other distinction. In both the sporidia are broadly elliptic.

6. Peziza *calycina,* Fr. *Syst. v.* 2. *p.* 91.

HAB. On dead twigs of *Dacrydium Colensoi, Sinclair.*

7. Peziza *Colensoi,* Berk.; pallide alutacea, cupula infundibuliformi breviter stipitata basi plicata sursum margine inflexo subtiliter tomentosa. (TAB. CV. Fig. 5.)

HAB. On dead sticks, near the River Manawatu, *Colenso.*

About one-third of an inch in diameter, pale tan-coloured, infundibuliform, with a short, thick stem, fixed by an orbicular disc, plicate at the base, very minutely downy above and on the margin, but by no means ciliated. *Hymenium* even. *Asci* nearly equal; paraphyses filiform; sporidia about $\frac{1}{1000}$ of an inch in diameter, oblong, elliptic, or subfusiform; endochrome retracted into from two to four bodies, but not truly septate.—Allied to *P. Afzelii,* with which it agrees in size, but distinguished by the absence of all cilia at the edge.—PLATE CV. Fig. 5. *Peziza Colensoi,* Berk., *natural size.* *a.* Asci and paraphyses, *magnified.* *b.* Sporidia, *magnified* 250 *diameters.* *c.* Sporidia, *more highly magnified.*

8. Peziza *chrysotricha*, Berk.; cupula sessili primum globosa demum subhemisphærica aurea floccis innatis intricatis vestita subpulverulenta, sporidiis brevibus cymbiformibus. (TAB. CV. Fig. 7.)

HAB. On twigs on the shores of Waikare Lake, *Colenso*.

About a line across. *Cups* bright golden-yellow, at first globose, then subhemispherical, sometimes with a slight membranous edge, thickly clothed with short, matted hairs, somewhat pulverulent. *Hymenium* closed when dry, seated on a stratum of large, but unequally-sized cells. *Asci* cylindrical, rather large; sporidia cymbiform, slightly attenuated at either end, $\frac{1}{2250}$ of an inch long.—A remarkably beautiful species.—PLATE CV. Fig. 7. *Peziza chrysotricha, natural size. a*, hairs; *b*, external cells; *c*, ascus and paraphyses:—*magnified. d*. Sporidia, *magnified* 250 *diameters*.

* Peziza *monticœcola*, Berk.; atra, expansa, margine angusto, ascis clavatis amplis, sporidiis subcymbæformibus endochromate partito.

HAB. On decaying *Montia fontana*. Ahuriri, Eastern Coast, *Colenso*.

Minute, black, soon expanded, with a narrow margin, sometimes flexuose. *Asci* clavate, large; sporidia subcymbiform; endochrome bipartite; paraphyses linear, much longer than the asci.—Allied to *P. atrata*, but apparently distinct from all its forms.

Gen. LVII. PATELLARIA, *Fries*.

Receptaculum marginatum, patellæforme, semper apertum. *Hymenium* læve, persistens, sed ex apicibus ascorum aere adustis pulverulentum.

The more persistent cups and the pulverulent hymenium, like that of many Lichens, the tips of whose asci are often rough, with little amorphous granules, distinguish this genus from *Peziza*. I do not find the asci connate, nor are paraphyses wanting. Most of the species are found exclusively in the temperate zones, but *P. nigro-cinnabarina*, Schwein., which occurs in the warmer parts of the United States and Surinam, occurs also in New Zealand. (Name from *patella*, a saucer.)

1. Patellaria *nigro-cinnabarina*, Schwein.! *Syn. no.* 1959.

HAB. On dead branches, *Colenso*.

Exactly the North American species, which is remarkable for its vermilion-coloured hymenium. The sporidia resemble those of *Hysterium elevatum*, P.

2. Patellaria *atrata*, Fr. *Syst. v.* 2. *p.* 160.

HAB. On dead bark, *Colenso*.

Specimens from different parts of the world vary a little in the shape and length of the spores, and the more or less flexuous cups, but all agree in essential characters. The New Zealand specimens are seated on a white crust, which is clearly extraneous.

Gen. LVIII. CENANGIUM, *Fries*.

Receptaculum subcoriaceum. *Hymenium* læve, persistens. *Cupula* clausa, sero aperta.

Resembling *Peziza* in outward form, but of a firmer, tougher texture, and peculiar habit. (Name from κενος, *empty*, and αγγειον, *a receptacle*.)

* Cenangium *Colensoi*, Berk.; sparsum, primitus oblongum, demum orbiculari-expansum, fuscum, hymenio pallido subcarneo, sporidiis minutis elliptico-subcymbiformibus.

HAB. On dead leaves, apparently of *Phormium, Colenso*.

Scattered, at first covered with the cuticle, at length expanded, externally brown; disc pale, faintly tinged with pink. *Asci* oblong. *Sporidia* elliptic, subcymbiform, hyaline, $\frac{1}{4000}$ of an inch long.

Gen. LIX. EXCIPULA, *Fries.*

Perithecia carbonacea, sphærica, libera, primo clausa, dein aperta; ore orbiculari, integro; nucleo nudo, gelatinoso, turgido. *Asci* perfecti.

Very near to *Phacidium*, but distinguished by its regular, not laciniate orifice. I consider the genus as comprising only species with perfect asci. No tropical form is known. (Name from *excipula*, a receptacle.)

1. Excipula *nigro-rufa*, Berk.; minuta, subglobosa, ore inflexo, extus nigra, intus rufa, ascis amplis, sporidiis hyalinis obovato-oblongis obliquis subquadriseptatis. (TAB. CVI. Fig. 11.)

HAB. On the under side of leaves of *Pittosporum crassifolium*, near the River Te Waiohingaanga, Hawke's Bay, *Colenso.*

Having much the appearance of a large *Erysiphe* buried in the pubescence of the leaf. *Cups* subglobose, externally black, margin reflexed. *Hymenium* rufous. *Asci* clavate, obtuse. *Sporidia* hyaline, obovate-oblong, obtuse, subcymbiform, with about four transverse septa, and occasionally an oblique one in the upper division.—PLATE CVI. Fig. 7. *a.* Asci of *Excipula nigro-rufa*, Berk., with sporidia, *magnified.* *b.* Sporidia, *magnified* 250 *diameters.* *c.* Sporidia, *more highly magnified.*

* Excipula *gregaria*, Berk.; minuta, extus nigra, maculæ fuscæ inspersa, hymenio pallido, ascis amplis clavatis, sporidiis obovato-oblongis, endochromate demum bipartito.

HAB. On the upper side of the living leaves of some *Gnaphalium, Colenso.*

Crowded upon a brownish spot, often following the direction of the main nerves, minute; cups black externally; disc pale. *Asci* clavate, rather thick. *Sporidia* obovate-oblong, $\frac{1}{2250}$ of an inch long. *Endochrome* at length obscurely bipartite.

Gen. LX. CORDYCEPS, *Fries.*

Stroma elevatum, carnosum, sæpius stipitatum, lætius coloratum. *Perithecia* peripherica, tenera. *Sporidia* longissima; endochromata plurima, ut plurimum dissilientia.

One of the most interesting genera of Fungi, most of whose species grow from caterpillars or pupæ, which, it is probable, are often destroyed by the mycelium; and a few minute species are the perfect development of the different kinds of ergot. Several species occur in the warmer parts of North America, and they are not wanting in the tropics. (Name from κορδυλη, *a club.*)

1. Cordyceps *Robertsii*, Hook. *Ic.* Sphæria Hügelii, *Corda, Ic. fasc.* 4.

HAB. On larvæ of *Hepialus virescens;* mostly under tree-ferns, in spring. Common.

One of the most remarkable of the Entomogenous Fungi, which exists in almost every collection of singular natural productions. The species is admirably figured by Corda, in almost all its details. As in most allied species, the perithecia vary greatly as to the degree in which they are immersed. Some general information on the Fungus will be found in Hook. Lond. Journ. vol. ii. p. 209, where several other insect *Sphæriæ* are described.

Gen. LXI. HYPOCREA, *Fries.*

Stroma horizontale, carnosum vel subgelatinosum, ut plurimum lætius coloratum. *Perithecia* tenera; sporidia indefinita.

The fleshy or gelatinous substance, the brighter colour (which however varies to olive and dark green), and indefinite sporidia, are the distinctive marks of this genus, which cannot be confounded with *Hypoxylon.* Little is at present known of extra-European species, with the exception of a few from North America, and a very fine one which occurs in Sikkim and Java. (Name from ὑπο, *beneath,* and κρεας, *flesh.*)

1. Hypocrea *gelatinosa*, Fries. Sphæria gelatinosa, *Tode.*

HAB. On decorticated wood, *Colenso.*

Gen. LXII. NECTRIA, *Fries.*

Perithecia libera vel mycelio insidentia, tenera, læte colorata, verticalia. *Sporidia* ut plurimum octona, translucida.

This genus bears the same relation to *Hypocrea* that *Sphæria* does to *Hypoxylon.* Many of the species are very pretty; a few only are tropical. Occasionally, as in *N. cinnabarina*, the perithecia have a thick coat, but in general they are very delicate. (Name from *νηκτρις, a swimmer*, in allusion to the fluxile contents of the perithecia.)

1. Nectria *polythalama*, Berk.; cæspitosa, peritheciis ovatis subglobosisve apice umbilicatis depressisve coccineis, umbilico obscuro, sporidiis multiseptatis. (Tab. CVI. Fig. 15.)

Hab. On dead bark, Bay of Islands, *J. D. H.*

Cæspitose, dull scarlet. *Perithecia* ovate, umbilicate at the apex, or depressed, the depression being darker than the rest of the surface, which is of a dull scarlet, inclining sometimes to orange. *Sporidia* about $\frac{1}{1000}$ of an inch long, but very variable, oblong, multiseptate.—Resembling *N. cucurbitula*, but with very different fruit. I have not seen perfect asci.—Plate CVI. Fig. 15. Sporidia of *Nectria polythalama, magnified* 250 *diameters.*

2. Nectria *illudens*, Berk.; sparsa, globosa, cellulis hic illic conglomeratis, rugosa, ochracea cinnabarinaque, apice collapso umbilicata, sporis ellipticis uniseptatis amplis.

Hab. On bark, Bay of Islands, *J. D. H.*

Scattered, or slightly crowded, but not cæspitose, globose, bright yellow-ochre, or cinnabar, rough with little warts, which are composed of large cells, dimpled at the apex. *Sporidia* elliptic, subcymbiform, $\frac{1}{1162}$ of an inch long, $\frac{2}{5}$ as much broad.—This has some resemblance to *N. ochracea* and *cinnabarina*, if the two are really distinct, but may be known by the larger size, the more ample cells of which the warts are composed, and the far larger and broader sporidia. In different specimens of *S. cinnabarina*, they vary from $\frac{1}{1750}$ to $\frac{1}{2000}$ of an inch long. I have an authentic specimen of Dr. Greville's *S. ochracea*, which is very different from that before us, but unfortunately the fructification is immature. The cells of the warts are, however, far smaller, and resemble those of *N. cinnabarina*. I have no specimen of Dr. Montagne's plant from Chili; but were there so striking a difference in the size and form of the sporidia, he could not have failed to point it out. They resemble, indeed, those of *N. discophora*, as figured in the 'Flora Chilena.'

Gen. LXIII. XYLARIA, *Fries.*

Stroma clavatum, subsuberosum, demum ut plurimum friabile, nigrum. *Stipes* sæpe distinctus. *Perithecia* peripherica; sporidia octona.

This genus contains a vast quantity of species, many of which are the ornaments of the tropical forests, in which especially they abound. A few only are found in more temperate regions, but some of these, as *Xylaria Hypoxylon*, occur very frequently. All the species grow on vegetable substances, or the dung of graminivorous animals. (Name from *ξυλον, wood.*)

1. Xylaria *Hypoxylon*, Fries. Sphæria Hypoxylon, *Ehr.*

Hab. On dead wood, River Manawatu, etc., *Colenso.*

2. Xylaria *multiplex*, Kze.

Hab. On dead wood, *Colenso.*

Exactly the Juan Fernandez species, except that the stem is clothed with brown hairs. Having no authentic specimen of Kunze's plant, I depend upon my friend Dr. Montagne for the right determination of the species. I find the sporidia about $\frac{1}{1162}$ of an inch long, as also in Dr. Montagne's plant. In both, the perithecia are nearly globose, with ostiola scarcely visible externally.

3. Xylaria *anisopleuron,* Mont. *Ann. des Sc. Nat. Ser.* 2. *v.* 13. *p.* 348.

Hab. On dead wood, River Manawatu, *Colenso.*

The specimens are young, and at present without perithecia, but the general form is just that of Dr. Montagne's species, from Cayenne, who half suspects that it may be only a form of *X. polymorpha.*

4. Xylaria *castorea,* Berk.; stipite brevi primum spongioso-velutino demum nudo rugoso, clavula obtusa ovata vel subelliptica valde compressa minutissime areolata, ostiolis prominulis punctato-aspera. (Tab. CV. Fig. 10.)

Hab. On dead wood, *Colenso.*

Stem about $\frac{1}{4}$ of an inch high, at first clothed with spongy down, then naked, longitudinally wrinkled; *head* ovate, or subelliptic, strongly compressed, obtuse, about 1 inch long, and $\frac{1}{2}$–$\frac{2}{3}$ broad, sometimes giving off a second head at the base, minutely areolate, dotted with the slightly prominent ostiola. *Asci* slender; *sporidia* subelliptic, $\frac{1}{2500}$ of an inch long.—A very distinct species, resembling most *X. lingua,* Lév. True *X. polymorpha* has the sporidia about $\frac{1}{1000}$ of an inch long. The name indicates the resemblance of the head to a beaver's tail.—Plate CV. Fig. 10. *Xylaria castorea, natural size. a.* Asci and paraphyses, *magnified. b.* Sporidia, *magnified* 250 *diameters.*

5. Xylaria *tuberiformis,* Berk.; suberosa, subglobosa, pileiformis, stipite brevissimo l. obsoleto, ostiolis prominentibus, sporidiis magnis. (Tab. CV. Fig. 11.)

Hab. On dead wood, near the River Manawatu, *Colenso.*

Sessile or shortly stipitate, subglobose, $\frac{1}{4}$–$\frac{1}{3}$ of an inch in diameter, pileiform; cuticle minutely cracked, and rough with little points, not laccate; white and corky within. *Perithecia* elliptic. *Ostiola* large, prominent. *Sporidia* cymbiform, $\frac{1}{1000}$ of an inch long.—Resembling *X. pilæformis,* Berk. et Curt., but without its laccate coat, and having far larger ostiola and sporidia. Its nearer affinities are with *X. anisopleuron,* Mont., and *X. polymorpha;* at first sight it looks like a small Truffle.—Plate CV. Fig. 11. *Xylaria tuberiformis, natural size; a,* sporidia; *b, Macrosporium obtusum,* from ostiola:—*magnified* 250 *diameters.*

Gen. LXIV. HYPOXYLON, *Bull.*

Stroma liberum, friabile, horizontale, nigrum. *Perithecia* peripherica. *Asci* perfecti; *sporidia* octona.

The horizontal stroma distinguishes this genus from *Xylaria. Sphæria vernicosa* is, however, almost intermediate. All the species are of more or less interest, and several occur in the tropics; they are quite distinct from the matrix, and therefore need not be confounded with the species of *Diatrype.* (Name from ὑπο, and ξυλον, *wood.*)

1. Hypoxylon *concentricum,* Fries. Sphæria concentrica, *Bolt.*

Hab. On dead wood, Bay of Islands, *J. D. H.;* River Manawatu, etc., *Colenso.*

2. Hypoxylon *annulatum,* Mont. *Flora Chilena, p.* 445. *t.* 10. *f.* 3.

Hab. On dead bark.

The New Zealand specimens are accompanied by a thick, abundant, clothy mycelium, consisting of closely-interwoven threads, very much branched, whose ultimate ramuli are alternate, and zigzag, with frequently bifid, spinulose apices, resembling, on a small scale, the flocci of a *Mycenastrum.*

Gen. LXV. DIATRYPE, *Fries.*

Stroma horizontale, erumpens, cortice subconnatum. *Perithecia* collo longiusculo prædita.

The Fungi of this group are known from *Hypoxylon,* by their being more or less confluent with the matrix, and therefore approximating more to the type of such Lichens as *Trypethelium.* The tropical species, which are numerous, exhibit usually a distinct habit, and differ from those of the temperate zones. (Name from δια, *through,* and τρυπα, *a perforation.*)

1. Diatrype *glomeraria*, Berk.; erumpens, angulata vel confluenti-elongata, stromate parco pallido, peritheciis ovatis, collo brevi ostioli obscuro, sporidiis octonis curvis majoribus. (Tab. CVI. Fig. 13.)

Hab. On smooth branches of *Rhipogonum parviflorum*, Titiocura, *Colenso.*

Pustules thickly scattered, often connected by a thin, brown stratum, angular or elongated from the confluence of two or more individuals, erumpent, but closely adherent to the cuticle, black, opaque, scarcely $\frac{1}{2}$ a line long; disc minutely scabrous; stroma pale; perithecia crowded, resting on the matrix, ovate, subglobose, with a short neck, and scarcely traceable ostiola. *Asci* evanescent, containing eight, linear, obtuse, curved sporidia, $\frac{1}{1750}$ of an inch long.—Closely allied to *D. verrucæformis*, from which it differs principally in its smaller and more free pustules, more obscure ostiola, and much larger sporidia. Those of *D. verrucæformis* are about $\frac{1}{4375}$ of an inch long. This species may also be compared with *S. smilacicola*, Schwein., which is, however, smoother, and has frequently a dilated, crenate, barren border at the base. The authentic specimens unfortunately are without fruit, so that I cannot compare the two in this respect. That species moreover is quite free, and therefore is a true *Hypoxylon.*—Plate CVI. Fig. 13. *a.* Ascus of *Diatrype glomeraria*, with its sporidia, *magnified.* *b.* Sporidia, *magnified* 250 *diameters.*

* Diatrype *lata*, Fr. Sphæria lata, *P.*

Hab. On dead sticks, *Colenso.*

Gen. LXVI. SPHÆRIA, *Hall.*

Stroma nullum vel spurium, myceloideum. *Perithecia* varia, firma, verticalia, nigra vel fuliginea, sæpe corticata. *Asci* perfecti; sporidia ut plurimum octona.

This comprises all such species as are either simple or merely connected by mycelium, which does not form a regular stroma in which the perithecia are immersed. The species are very numerous, occurring in all countries and situations, even at some depth in salt water, or on the rejectamenta of the tide. (Name from σφαιρα, *a sphere.*)

1. Sphæria (Cæspitosæ) *fragilis*, Berk.; peritheciis congestis fragilissimis nigro-fuscis obtusis opacis minimis, sporidiis hyalinis breviter subfusiformibus uniseptatis. (Tab. CVI. Fig. 7.)

Hab. On the under side of the leaves of *Eurybia furfuracea*, *Colenso.*

Forming little scattered clusters of brownish, opaque, obtuse, extremely brittle perithecia, insomuch that they break off while still filled with the white mass of fructification. *Ostiolum* obsolete. *Sporidia* varying from $\frac{1}{1000}$–$\frac{1}{1660}$ of an inch in length, shortly fusiform, often broader at one end, uniseptate, hyaline.—This species has the habit of *S. pulicaris*, but is totally different. There is not the slightest tinge of blue, as in that species.—Plate CVI. Fig. 7. Sporidia of *Sphæria fragilis*, *magnified* 250 *diameters.*

2. Sphæria (Cæspitosæ) *pullulans*, Berk.; peritheciis aggregatis subglobosis astomis vel ore leviter prominulo opacis, ascis subcylindricis, sporidiis oblongis utrinque attenuatis curvulis uniseptatis.

Hab. On leaves of *Leucopogon Fraseri*, principally on the under surface, Mission Station, *Colenso.* (Tab. CVI. Fig. 6.)

Forming little specks on the leaves, consisting of a few crowded, subglobose, opaque, dark brown perithecia, without any trace of blue, either altogether destitute of any distinct orifice, or with a slight papillæform prominence. *Asci* subcylindric; sporidia composed of two opposed cones, about $\frac{1}{1500}$ of an inch long.—Plate CVI. Fig. 6. *a.* Asci of *Sphæria pullulans*, *magnified.* *b.* Sporidia, *magnified* 250 *diameters.*

3. Sphæria (Cæspitosæ) *rasa*, Berk.; conferta, peritheciis oblongis apice convexo obtuso liberis, ostiolo punctiformi, superficie opaca quasi rasa, ascis farctis, sporidiis curvulis.

Hab. On dead decorticated *Weinmannia*, head of the River Manawatu, *Colenso.*

Forming little round neat clusters. *Perithecia* oblong, crowded together below, free above, and convex, not collapsing, pierced with a minute orifice, opaque, as if minutely downy, but in reality rough from the projecting dissepiments of the external cells, as if they had been shaved off. *Asci* cylindrical, slightly attenuated below, con-

taining multitudes of curved sporidia $\frac{1}{5500}$ of an inch long.—A very distinct species, well characterized by its peculiar surface and fructification.—PLATE CVI. Fig. 5. *a.* Ascus of *Sphæria rasa*, filled with sporidia, *magnified.* *b.* Sporidia, *magnified* 250 *diameters.* *c.* Portion of the cellular tissue of the outer coat, *magnified, to show the open cells.*

* Sphæria (Cæspitosæ) *Saubinetii*, Mont. et Durieu, *Fl. Alg. p.* 479.

HAB. On dead leaves of some Monocotyledon, *Colenso.*

Perithecia solitary, or slightly aggregate. *Sporidia* $\frac{1}{1250}$ of an inch long, as in authentic specimens from Algiers.

* Sphæria (Cæspitosæ) *pulicaris*, P.

HAB. On dead sticks, *Colenso.*

Perithecia crowded, more minute. *Sporidia* $\frac{1}{750}$ of an inch long.

4. Sphæria (Obtectæ) *livida*, Fr. *Syst. v.* 2. *p.* 479.

HAB. On dead, bleached twigs.

The perithecia are irregular, and the sporidia $\frac{1}{1250}$ of an inch in diameter; they have a pale spot at each end of the endochrome, and do not agree exactly with any of the forms figured by Montagne in the 'Flora of Algiers,' all of which I have verified. I have great doubts about the stability of the two species there separated from *S. livida*, with which the plant from New Zealand has about an equal right to be considered a species.

5. Sphæria (Caulicolæ) *coffeata*, Berk.; tecta, peritheciis subglobosis epidermide tosta designatis, ascis cylindricis, sporidiis filiformibus. (TAB. CVI. Fig. 3.)

HAB. On sheaths of Grasses, *Colenso.*

Perithecia scattered, subglobose, indicated by little brown, shining, convex specks in the cuticle. *Asci* cylindrical. *Spores* filiform, elongated.—Resembling externally *S. phæosticta*, but differing very much in fructification, which is like that of *S. eucrypta.*—PLATE CVI. Fig. 3. Portion of ascus and sporidia of *Sphæria coffeata, magnified.*

6. Sphæria *herbarum*, P.

HAB. On the sheaths of Grass-leaves, *Colenso.*

Quite concealed beneath the cuticle, but agreeing exactly in fruit, especially with that form of the species noticed under the name of *S. herbarum*, var. *glumarum*, Ann. of Nat. Hist. vol. ix. p. 378. There is a second form, with immature sporidia, which I refer to this species, which has a peculiar appearance, from the cuticle being so closely applied to the sides of the perithecia as to give the centre, where it is free, a white sclerotioid aspect. Without mature sporidia it is impossible to say whether it is a distinct species or not.

7. Sphæria (Foliicolæ) *acetabulum*, Berk.; hypo- et epiphylla, peritheciis tectis depressis subirregularibus omnino astomis supra collapsis subtus convexis, ascis oblongis attenuato-truncatis. (TAB. CVI. Fig. 2.)

HAB. On dead leaves of *Corynocarpus lævigata*, Te Apiti, *Colenso.*

Minute, black, covered by the cuticle. *Perithecia* slightly irregular, depressed, convex below, concave above, adnate with the cuticle in the centre, but without any trace of an orifice. *Asci* oblong, attenuated above, and truncate. *Sporidia* oblong (immature). I have in vain hunted for mature sporidia; there can be no doubt, however, that the species is undescribed.—This grows with *Phoma acmella*, which is possibly the spermatogonous form of the species.—PLATE CVI. Fig. 2. Asci and immature sporidia of *Sphæria acetabulum, magnified* 250 *diameters.*

Gen. LXVII. DOTHIDEA, *Fries.*

Perithecia spuria, l. cellulæ in stromate plus minus immersæ, demum ore simplici apertæ. *Asci* perfecti.

A genus abounding in species, comprising such *Sphæriæ* as are destitute of true perithecia. (Name from δοθιηυ, *a tubercle*, and ειδος, *resemblance*.)

* Dothidea *Ribesia*, Fr. *Syst. v.* 2. *p.* 550.

Hab. On Gooseberry twigs, *Colenso.*

* Dothidea *filicina*, Mont. *MSS.*

Hab. On the under side of Fern-leaves, *Colenso.*

Dr. Montagne's specimens are from Otaheite, on some species of *Adiantum*; and a form occurs in Ceylon, of which a description will shortly appear in the 'London Journal of Botany.' In that the asci are short, obovate, and the sporidia obovate, uniseptate, $\frac{1}{2000}$ of an inch long. I have seen no fruit in the New Zealand specimens, but they have the same brittle stroma and Rhytismoid aspect.

* Dothidea *Colensoi*, Berk.; orbicularis, utrinque fertilis, cellulis minutissimis.

Hab. On decaying leaves, *Colenso.*

Orbicular, about one line broad, pitch-black, minutely granulated, fertile on either side. *Cells* minute, white within.—I have not seen perfect fruit, but it is a very distinct species.

Gen. LXVIII. PEMPHIDIUM, *Mont.*

Perithecia spuria, convexa, scutiformia, atra, ab epidermide nigrefacta formata, apice papillula, interdum bilabellata, coronata vel astoma. *Nucleus* gelatinosus. *Asci* perfecti; sporidia elongata.

The spurious perithecia separate this genus from its neighbours. The habit is very peculiar. It is analogous to *Phlyctæna*. Only two species are known, one of which occurs in Cayenne. (Name from πεμφις, *a bubble*.)

1. Pemphidium *opacum*, Berk.; maculis minoribus nigris opacis hic illic aggregatis, sporis fusiformibus utrinque valde attenuatis. (Tab. CVI. Fig. 9.)

Hab. On dead stems of *Rhipogonum*, Titiokura, *Colenso.*

Forming little patches 1–2 lines broad, consisting of round, black, opake, flat specks, which are generally without any trace of an ostiolum. Beneath each speck is an ovate, transparent mass of asci, arising from an evident base, but without any visible perithecium. *Asci* moderately long, cylindrical or slightly swollen in the middle; spores fusiform, attenuated into a thread at either extremity; endochrome divided irregularly into two or three masses, without any dissepiments.—A very distinct species from *Pemphidium nitidum*, which forms large patches of convex, shining spots. The sporidia are far more attenuated than in that species, though in that I find them more acuminate than they are represented in Dr. Montagne's figure.—Plate CVI. Fig. 9. *a.* Asci of *Pemphidium opacum, magnified.* *b.* Sporidia of the same, *magnified* 250 *diameters.*

Gen. LXIX. MICROPELTIS, *Mont.*

Perithecium liberum, carbonaceum, dimidiato-scutatum, orbiculatum, applanatum, poro centrali pertusum. *Asci* clavati, erecti, sporidia septata hyalina foventes.

A single species only of this genus is known, which abounds in the tropics, and occurs on a variety of leaves. Its place in colder regions is supplied by *Microthyrium* and *Sacidium*, from which the septate spores are scarcely a sufficient distinction. (Name from μικρος, *small*, and πελτη, *a target*.)

1. Micropeltis *applanata*, Mont. *Cuba, p.* 325. *t.* 12. *f.* 6.

Hab. On leaves of *Panax arborea*, Ship Cove, *Lyall.*

The specimens are young and without fruit, in the absence of which there is some uncertainty.

Gen. LXX. ASTERINA, *Lév.*

Perithecia fragilia, applanata, minuta, epiphylla, e mycelio fimbriata. *Asci* perfecti; sporidia octona.

All the species of this genus are epiphyllous, and make a near approach to *Strigula*. I do not know of any European species, unless *Strigula Babingtonii*, Berk., belong more properly to *Asterina;* but the genus occurs in the United States, and the tropics produce one or two. (Name from *aster*, a constellation.)

* Asterina *torulosa*, Berk.; mycelio parcissimo, ascis elongatis, sporidiis torulosis viridi-hyalinis.

HAB. On leaves of *Piper excelsum*, *Colenso*.

Perithecia scattered, but grouped in little spots. *Asci* elongate. *Sporidia* filiform, torulose, 3–5-septate, $\frac{1}{2000}$–$\frac{1}{1500}$ of an inch long.—This species occurs also on *Asterina dilatata*, Berk., which is perhaps only an incipient *Collema*, and therefore omitted as doubtful. Like the original specimens described in the 'Antarctic Flora,' it occurs on *Panax*.

1. Asterina *sublibera*, Berk.; mycelio parcissimo e fibris intertextis, ascis elongatis, sporidiis quaternis uniseptatis hyalinis. (TAB. CVI. Fig. 1.)

HAB. On leaves of *Metrosideros diffusa*, *Colenso*.

Perithecia collected in little patches, with a few radiating fibres, which by no means form a membrane. *Asci* elongated, subcylindrical, rather attenuated at the apex. *Sporidia* four in each ascus, oblong, slightly constricted in the centre, uniseptate, hyaline, $\frac{1}{1750}$ of an inch long.—Differing in its elongated asci from all known species, except the foregoing, an unpublished one, *A. anomala*, from Ceylon, in which the mycelium is very dense, and the sporidia narrower.—PLATE CVI. Fig. 1. *Asterina sublibera, natural size. a.* Asci, *magnified. b.* Sporidia, *magnified* 250 *diameters.*

* Asterina *fragilissima*, Berk.; maculis parvis orbicularibus, mycelio parco, peritheciis congestis, ascis globosis, sporidiis obovato-oblongis uniseptatis.

HAB. On leaves of *Veronica*, *Colenso*.

Spots scarcely a line broad. *Mycelium* sparing, forming rectangular anastomoses. *Perithecia* numerous, crowded towards the centre of the spots, extremely brittle. *Asci* globose. *Sporidia* obovate-oblong, uniseptate, $\frac{1}{1250}$ of an inch long.

Gen. LXXI. ERYSIPHE, *Hedw. et Lév.*

Perithecia libera, globosa, astoma, floccos æquales flexuosos simplices vel parce furcatos a basi emittentia, indeque ex iis suffulta. *Asci* sacciformes.

The genus *Erysiphe*, as reformed by Léveillé, consists of those species only whose appendages are simple and equal throughout. With other allied genera, they are the pest of cultivators. They occur only in temperate regions. (Name from ερυσιβη, *rust*, a name more properly applicable to *Uredo*.)

1. Erysiphe *densa*, Berk.; bifrons, mycelio denso arachnoideo persistente, sporangiis mediis globosis sparsis, appendiculis flexuosis candidis intertextis obovatis brevibus, sporidiis ellipticis suboctonis. (TAB. CVI. Fig. 16.)

HAB. On living leaves of *Aristotelia*, Wairarapa, *Colenso*.

This differs from *E. Martii*, Lév., merely in its thick persistent mycelium, which gives it a very lichenoid appearance, especially when on the upper surface of the leaves. The appendages are flexuous, sometimes forked, and frequently bear one or two little knots towards the end, showing a tendency to ramify.—PLATE CVI. Fig. 16. *a.* Sporangium of *Erysiphe densa*, with its appendages, *magnified. b.* Asci, *magnified* 250 *diameters.*

Gen. LXXII. MELIOLA, *Fries.*

Perithecia fragilia, carbonacea, astoma, e mycelio strigoso enata. *Asci* ampli. *Sporidia* magna, pauca, opaca.

A very curious genus, allied to *Erysiphe*, but with a Dematioid habit. The species occur in warm climates, and are furnished with variously formed fulcra, as in *Erysiphe*. (Name of doubtful origin.)

1. Meliola *amphitricha*, Fr. *El. v.* 2. *p.* 109. *Bornet in Ann. des Sc.* 1851, *v.* 16. *p.* 267.
HAB. On living leaves of various plants, *Colenso.*

Gen. LXXIII. CHÆTOMIUM, *Kze.*

Perithecium membranaceum, astomum, pilis opacis vestitum. *Asci* gelatinosi, cito evanidi. *Sporidia* fusca.

Distinguished principally from *Sphæria* by its brittle, membránaceous perithecia, and evanescent asci. (Name from χαιτη, *hair.*)

* Chætomium *amphitrichum*, Corda, *Ic.*
HAB. On damp paper, *Colenso.*

* Chætomium *elatum*, Kze. *Myc. Heft. t.* 1. *p.* 15 (quoad nomen genericum), *Exs. n.* 184.
HAB. On damp straw, *Colenso.*

Gen. LXXIV. CAPNODIUM, *Mont.*

Flocci nigerrimi, articulati, moniliformes, immixtis aliis æqualibus, sporangia elongata quandoque ramosa apice sæpe fimbriato-investientes. *Asci* in quibusdam perfecti, in aliis sporæ tantum (spermatia ut videtur) adsunt.

A very curious genus, from its close connection with *Antennaria*, insomuch as to make it probable that it is the more perfect form of that genus. The sporangia, which are much elongated, sometimes contain asci and sporidia, but sometimes produce merely minute spores; but besides this, in certain stages of growth they present all the characters of *Antennaria;* at least, in the same specimen, some parts exhibit the characters of that genus, while others have the structure of *Capnodium.* (Name from καπνος, *smoke.*)

1. Capnodium *fibrosum*, Berk.; crassum, compactum, sporangiis elongatis rigidis fasciculato-ramosis.
HAB. On bark, *Colenso.*

Forming a rigid, bristly stratum $\frac{1}{3}$ of an inch thick. *Sporangia* very much crowded, sometimes making almost a solid mass, fasciculato-ramose, very much elongated and very rigid.—The specimens are not in a very good state, and I can therefore make only an imperfect description. The species, however, is very distinct.

Gen. LXXV. ANTENNARIA, *Lk.*

Flocci nigerrimi, articulati, moniliformes, hic illic sporangia granulis vel plantulâ pusillâ repleta emittentes.

The pests of plants, especially of those with persistent leaves, in all climates, but nowhere more abundant than in New Zealand. *A. scoriadea*, which forms thicker masses than the other species, perfectly smothers the plants in which it grows. (Named from the resemblance of the threads to the *antennæ* of some insects.)

1. Antennaria *Robinsonii*, Mont. *in Hook. Lond. J. Bot. v.* 2. *p.* 641. *t.* 24*.

HAB. On leaves of *Phormium*, Middle Island, *Lyall;* on *Hymenophyllum, Colenso;* and on many other plants.

It is almost impossible to say what is a species in this genus. Dr. Lyall's plant has quite the characters of that of Dr. Montagne, except that I find the moniliform thread occasionally rough, as in *A. pannosa.* The sporangia too, instead of being filled with a mass of threads, are gorged with extremely minute granules. This is, however,

much more likely to be the normal condition of the fruit. The specimens form a dense coat on either side of the leaves, which easily peels off. The base consists of a closely interwoven, almost gelatinous web, traversed by a network of moniliform threads, from which rise erect, shortly-branched fibres, bearing either lateral or subterminal sporangia.—A subsequent examination of what is evidently the same species, but on the leaves of some Myrtad from the same locality, has exhibited precisely the same chætophoroid masses as figured by Dr. Montagne, so that there is no doubt about the species. There is a curious connection between the genera *Capnodium* and *Antennaria;* the one seems frequently to follow the other. In the last-mentioned specimens I find a single sporangium of *Capnodium,* with uniseptate spores.

2. Antennaria *scoriadea,* Berk. *in Hook. Fl. Ant. t.* 67. (Zasmidium, *Fr.*, Sect. Dendropogon.)

HAB. On various trees, extremely common, *Colenso.*

To be added to the Genus UROMYCES.

* Uromyces *citriformis,* Berk.; maculis obliteratis, soris sparsis epidermide persistenter cinctis, sporis magnis citriformibus breviter pedicellatis fuscis.

HAB. On leaves of some Orchid, apparently a *Thelemytra, Colenso.*

Spots obliterated. *Sori* scattered over the whole frond. *Epidermis* persistent. *Spores* lemon-shaped, brown, shortly pedicellate, $\frac{1}{750}$–$\frac{1}{500}$ of an inch long.

Since the analysis of New Zealand Fungi was drawn up, which appears at the commencement of this article, 35 additional species have come under notice. Of these

23 are European or Sikkim species from high altitudes.
12 subtropical or tropical.

Of the first:—

11 are common British species.
2 European.
1 Sikkim.
8 New.

Of the second:—

1 is a cosmopolite.
2 Indian.
1 Otaheite.
8 New species of subtropical types.

The whole list will give, therefore, 70 subtropical or tropical forms, and 123 European, instead of 58 subtropical or tropical, and 100 European; so that, on the whole, the European type prevails in the proportion of nearly two to one. As amongst the Phænogams, the number of genera is very large in proportion to the species.

Nat. Ord. CIII. ALGÆ, *L.*

By W. H. Harvey, M.D. etc. etc.

Series I. MELANOSPERMEÆ.

Tribe I. *FUCACEÆ.*

Gen. I. SARGASSUM, *Ag.*

(J. Ag. Sp. Alg. vol. i. p. 268. Kütz. Sp. Alg. p. 636. *Anthophycus,* Kütz. l. c. p. 605. *Pterocaulon,* Kg. l. c. p. 606. *Carpacanthus,* Kg. l. c. p. 621. *Stichophora,* Kg. p. 627. *Spongocarpus,* Kg. p. 631. *Halochloa,* Kg. p. 632.)

1. Sargassum *bacciferum,* Ag., *J. Ag. Sp. Alg. v.* 1. *p.* 344. *Kütz. Sp. p.* 609. *Hook. et Harv. Lond. J. Bot. v.* 4. *p.* 522. Fucus bacciferus, *Turn. t.* 47.

Hab. New Zealand, *D'Urville, Lesson, Sinclair.*

Distrib. Found floating in the Atlantic and Pacific Oceans. (Gulf-weed.)

2. Sargassum *vulgare,* Ag., *J. Ag. Sp. Alg. v.* 1. *p.* 342. *Hook. et Harv. in Lond. J. Bot. v.* 4. *p.* 522. Fucus natans, *Turn. Hist. t.* 46.

Hab. New Zealand, *Banks, Lesson.*

Distrib. Shores of the Atlantic and Pacific Oceans.

3. Sargassum *granuliferum,* Ag., *Ic. t.* 11. *J. Ag. Sp. Alg. v.* 1. *p.* 309. *Hook. et Harv. Lond. J. Bot. v.* 4. *p.* 522.

Hab. Cook's Straits, *D'Urville, fide Cunningham.*

This habitat appears to us to be more than doubtful. The species was founded on specimens brought by König from the Indian Ocean.

4. Sargassum *droserifolium,* Bory, *in Duper. Voy. p.* 129. *J. Ag. Sp. Alg. v.* 1. *p.* 347. *Hook. et Harv. Lond. J. Bot. v.* 4. *p.* 522.

Hab. New Zealand, *Lesson.*

5. Sargassum *crassifolium,* J. Ag., *Sp. Alg. v.* 1. *p.* 326. S. aquifolium, *Bory, Coqu. p.* 128. (*non Ag.*)

Hab. In the sea, between New Zealand and New Ireland, *D'Urville.*

6. Sargassum *duplicatum,* Bory, *Coqu. p.* 127. *J. Ag. Sp. Alg. v.* 1. *p.* 347. *Hook. et Harv. in Lond. J. Bot. v.* 4. *p.* 523.

Hab. New Zealand, *Lesson.*

7. Sargassum *scabridum,* Hook. fil. et Harv., *Lond. J. Bot. v.* 4. *p.* 522. *J. Ag. Sp. Alg. v.* 1. *p.* 347. *Kütz. Sp. Alg. p.* 614.

Hab. Bay of Islands, *J. D. H.* Houraki Gulf, *Lyall.*

8. Sargassum *Sinclairii,* Hook. fil. et Harv., *Lond. J. Bot. v.* 4. *p.* 522. *J. Ag. Sp. Alg. v.* 1. *p.* 300. *Kütz. Sp. Alg. p.* 606.

Var. *β. obtusifolia;* foliis firmioribus, superioribus latioribus obtusisque.

Hab. Bay of Islands, *Sinclair, Lyall, etc.* Auckland, Houraki Gulf, and Port Cooper, *Lyall.* Var. *β.* East Coast, *Colenso.*

9. Sargassum *Raoulii,* Hook. fil. et Harv. *in Lond. J. Bot. v.* 4. *p.* 523. *J. Ag. Sp. Alg. v.* 1. *p.* 288. *Kütz. Sp. Alg. p.* 616.

HAB. Akaroa, *Raoul.*

10. Sargassum *adenophyllum,* Harv.; stipite brevi mox in ramos plures diviso, ramis compressiusculis gracilibus longissimis indivisis lævibus plus minus flexuosis, foliis distichis alternis distantibus longe petiolatis dichotomo-multifidis, infimorum laciniis latiusculis linearibus membranaceis costatis parcissime glandulosis, superiorum laciniis filiformibus glandulis magnis elevatis instructis, vesiculis in petiolo filiformi sphæricis mucronulatis demum muticis, receptaculis . . . ?

HAB. New Zealand, *Lyall.*

Stipes 1–2 inches long, dividing into numerous, slender branches, 1–2 feet long, ½ a line in diameter, terete or subcompressed, quite smooth, set at distances of 1–2 inches with distichous, dichotomo-multifid, flabelliform leaves. The root-leaves, and those of the lower part of the stem, have membranous, strongly ribbed laciniæ; the upper leaves are filiform, destitute of laminæ, but furnished with several large and very prominent glands. *Vesicles* spherical, with a short mucro. *Fruit* unknown.—Allied to *S. Raoulii,* but with different root-leaves, and remarkably large glands.

11. Sargassum *plumosum,* A. Rich., *Fl. Nov. Zel. p.* 136. *J. Ag. Sp. Alg. v.* 1. *p.* 286. *Kütz. Sp. Alg. p.* 620. *Hook. et Harv. in Lond. J. Bot. v.* 4. *p.* 523. S. pennigerum *et* S. capillifolium, *Rich. l. c. t.* 5, 6.

HAB. Very common on the New Zealand coasts, *D'Urville, Colenso, Lyall, Sinclair, Hooker, etc.*

In Kützing's Sp. Alg. p. 617, a "*S. flexuosum,* Hook. fil." is described, but is unknown to us, unless it be a synonym of *S. plumosum.* It is possible that a specimen of this species may have been communicated by Dr. Hooker to Professor Kützing, accidentally inscribed "*flexuosum.*"

12. Sargassum *longifolium,* Ag., *J. Ag. Sp. Alg. v.* 1. *p.* 283. *Hook. et Harv. in Lond. J. Bot. v.* 4. *p.* 522. Anthophycus longifolius, *Kütz. Sp. Alg. p.* 605. Fucus longifolius, *Turn. Hist. t.* 164.

HAB. New Zealand, *Banks, D'Urville.*

Gen. II. TURBINARIA, *Lamour.*

(J. Ag. Sp. Alg. vol. i. p. 265. Kütz. Sp. Alg. p. 621.)

1. Turbinaria *ornata,* J. Ag., *Sp. Alg. v.* 1. *p.* 266. T. denudata (*partim*), Bory, *Coqu. p.* 117. *Kütz. Sp. Alg. p.* 621. Fucus turbinatus, *Auct.*

Var. β. *ornatus,* Turn. *Hist. t.* 24. *f. c.–h.*

HAB. New Zealand, *D'Urville.*

DISTRIB. Tropical Oceans.

Gen. III. CARPOPHYLLUM, *Grev.*

(Grev. Syn. Alg. p. xxxii. J. Ag. Sp. Alg. vol. i. p. 261. Kütz. Sp. Alg. p. 636.)

1. Carpophyllum *Phyllanthus,* Hook. fil. et Harv. *in Lond. J. Bot. v.* 4. *p.* 526. *J. Ag. Sp. Alg. v.* 1. *p.* 263. C. flexuosum, *Grev., Kütz. Sp. Alg. p.* 636 (*partim*). Fucus Phyllanthus, *Turn. Hist. t.* 206. Fucus flexuosus, *Esper. t.* 131.

HAB. New Zealand, *Banks, D'Urville, Sinclair, Lyall, Hooker, Colenso, etc.*; common.

2. Carpophyllum *Maschalocarpus,* Hook. fil. et Harv. *in Lond. J. Bot. v.* 4. *p.* 527. C. maschalocarpum, *Grev. J. Ag. Sp. Alg. v.* 1. *p.* 264. C. flexuosum, *var.* maschalocarpum, *Kütz. Sp. Alg. p.* 637. Fucus Maschalocarpus, *Turn. Hist. t.* 205.

HAB. New Zealand, *Sir Joseph Banks, D'Urville, Sinclair, Hooker, Lyall, Colenso, etc.*; common.

Gen. IV. MYRIODESMA, *Dcne.*

1. Myriodesma *quercifolium,* J. Ag., *Sp. Alg. v.* 1. *p.* 192. M. Boryanum, *Kütz. Sp. Alg. p.* 588. Lessonia quercifolia, *Bory, Coq. p.* 79. *t.* 4.

HAB. New Zealand, *Lesson.*

We only know this plant through Bory's figure, which is unlike any New Zealand Fucoid known to us.

Gen. V. LANDSBURGIA, *Harv.*

Frons heterogenea, e caule filiformi alternatim ramoso et foliis distinctis composita. *Vesiculæ* nullæ! *Scaphidia* in lamina foliorum superiorum minorum densissime aggregata, infra superficiem utramque excavata, sphæroidea, hermaphrodita. *Sporæ* intra perisporium hyalinum ovoideum parietale nidulantes. *Antheridia* fasciculata. *Paranemata* simpliciuscula, sporas et antheridia stipantia.

1. Landsburgia *quercifolia,* Harv. *in Herb.* Phyllospora quercifolia, *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 525 (*excl. syn. !*). (TAB. CVII.)

HAB. Bay of Islands, *D'Urville, Colenso, J. D. H., Lyall, etc.*

Root a conical, solid disc, 1–2 inches in diameter, throwing up numerous stems. *Stems* 3–4 feet long or more, terete, ¼ inch in diameter at the base, tapering upwards to the thickness of ½ a line, alternately decompound, nearly distichous. *Branches* filiform, erect or erecto-patent; the older ones naked below, smooth, slightly torulose, furnished with short, alternate, secondary branchlets at distances of 1–2 inches, the upper nearer. *Branchlets* erecto-patent, the older ones naked at the base and torulose, distichously foliaceous near the summit; gradually developed from the petioles of closely set alternate *leaves,* of which the lower are deciduous on the lengthening of the branch, the three or four terminal ones, with the excurrent bud, alone crowning the otherwise naked branchlets. *Leaves* alternate, scarcely a line asunder, 2 inches long, linear, inciso-pinnatifid, ¼–½ inch wide, tapering very much to the base, obtuse; the laciniæ oblong, erecto-patent, blunt or acute, sometimes dentate; substance membranaceo-coriaceous, translucent; the midrib vanishing about the middle. *Scaphidia* densely crowded in the terminal leaves of the branchlets, and in superaxillary foliations of the upper leaves of the larger branches; the fertile laminæ contracted to ¼–½ inch in length, ovate or lanceolate, sharply serrate. *Spores* oblong. *Colour,* when dry, a deep brownish-olive.

In our former list of New Zealand Algæ (Lond. J. Bot. vol. iv. p. 525), we confounded this fine plant with the *Fucus quercifolius* of Turner, now *Carpoglossum quercifolium,* J. Ag., a species with which we were then only acquainted by Turner's figure and description. We have long been aware of the incorrectness of this reference, and Dr. Harvey has for some time regarded the *Alga* now described as the type of a new genus, allied to *Phyllospora,* from which it differs in the absence of vesicles, the more perfect foliation, etc.; and to *Scytothalia,* from which the different evolution of the fruit distinguishes it. The habit is peculiar, and, with other minor differences, sufficiently distinguishes it from *Carpoglossum.* The generic name is bestowed in honour of our excellent friend the Rev. Dr. Landsborough, author of 'Popular British Seaweeds,' etc., an accomplished naturalist and most amiable man.—PLATE CVII. Fig. 1, part of the stem, and a branch; 2, the root and base of stems; *both figures the natural size;* 3, a receptacle; 4, section through the same; 5, paranemata, bearing antheridia, *more or less magnified.*

Gen. VI. MARGINARIA, *A. Rich.*

(A. Rich. Fl. Nov. Zel. p. 9. Mont. Pôle Sud, Bot. Crypt. p. 60. J. Ag. Sp. Alg. i. 254. Kütz. Sp. Alg. p. 637.)

1. Marginaria *Boryana,* A. Rich., *Nov. Zel. p.* 128. *Mont. Pôle Sud, t.* 2 *et* 3. *f.* 2. *J. Ag. Sp. Alg. p.* 256. *Kütz. Sp. Alg. p.* 637. *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 535.

HAB. New Zealand, *D'Urville, Lyall, Colenso.*

2. Marginaria *Urvilleana*, A. Rich., *Fl. Nov. Zel. p.* 10. *t.* 3. *Mont. Voy. Pôle Sud, p.* 60. *t.* 3. *f.* 1. *Hook. fil. et Harv. Fl. Ant. p.* 176. *Lond. J. Bot. v.* 4. *p.* 524. *Kütz. p.* 637. M. gigas, *A. Rich. N. Zel. t.* 4. *Kütz. Sp. Alg. p.* 637. *Hook. fil. et Harv. l. c.*

HAB. Kaua-Kaua Bay, *Lesson.* Banks' Peninsula, *Lyall.* South of Castle Point, *Colenso.*

Gen. VII. PHYLLOSPORA, *Ag.*

(Ag. Revis. Macrocyst. p. 311. J. Ag. Sp. Alg. i. 252. Kütz. Sp. Alg. p. 592.)

1. Phyllospora *comosa*, Ag., *J. Ag. Sp. Alg. v.* 1. *p.* 253. *Kütz. Sp. Alg. p.* 592. *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 525. Fucus comosus, *Labill. Pl. Nov. Holl. t.* 258. *Turn. Hist. t.* 142. Macrocystis comosa, *A. Rich. N. Zel. p.* 14, *et* 2. *p.* 142.

HAB. New Zealand, *D'Urville, Hooker.* (A native of New Holland.)

Gen. VIII. CYSTOPHORA, *J. Ag.*

(J. Ag. Symb. (1841) p. 3. J. Ag. Sp. Alg. i. 238. *Blossevillea*, Dcne. (1842) in Arch. Mus. ii. 147. Hook. fil. et Harv. Lond. J. Bot. iv. 527. Kütz. Sp. Alg. p. 628.)

1. Cystophora *monilifera*, J. Ag., *Sp. Alg. v.* 1. *p.* 241. Cystoseira retroflexa, *A. Rich. N. Zel. p.* 12 (*fide J. Agardh*). Fucus retroflexus, *Turn. t.* 155 (*non Labill.*).

HAB. New Zealand, *D'Urville.*

2. Cystophora *retroflexa*, J. Ag., *Sp. Alg. v.* 1. *p.* 242. Blossevillea retroflexa, *Kütz. Sp. Alg. p.* 629. *Hook. fil. et Harv. Lond. J. Bot. p.* 527. B. caudata, *Hook. fil. et Harv. Lond. J. Bot. v.* 6. *p.* 414. Fucus retroflexus, *Labill. N. Holl. p.* 113. *t.* 260 (*non Turn.*).

HAB. New Zealand, *D'Urville, Hombron, Colenso, Lyall, etc.*

A variable species in habit, generally more robust than the preceding, but only to be known with certainty by the form of the receptacles. We have not seen any New Zealand specimens of *C. monilifera*, but have from Dr. Lyall specimens collected in Cook's Straits, which in some respects are intermediate in character; having the dense ramification, broad stem, and strongly aculeated bases of the branches and spherical vesicles of *C. monilifera*, with the ensiform subtorulose receptacles of *C. retroflexa.*

3. Cystophora *retorta*, J. Ag., *Sp. Alg. v.* 1. *p.* 243. Blossevillea retorta, *Mont. Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 527.

HAB. New Zealand, *Hombron, Raoul.*

This plant is included in our former list of New Zealand Algæ, but we are not certain of the correctness of the reference, and cannot now refer to the specimens then examined.

4. Cystophora *torulosa*, J. Ag., *Sp. Alg. v.* 1. *p.* 243. Blossevillea torulosa, *Dcne., Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 527. *Kütz. Sp. Alg. p.* 628. Fucus torulosus, *R. Br. in Turn. Hist. t.* 157.

HAB. New Zealand, *D'Urville.* Port Cooper, Banks' Peninsula, *Lyall.*

5. Cystophora *Lyallii;* caule parum compresso siccitate longitudinaliter sulcato flexuoso bi-tripinnato, pinnis distichis e margine egredientibus basi nudis alterne verrucatis apice pinnulatis, pinnulis planis lineari-bus basi attenuatis grosse dentatis, dentibus alternis in receptacula ancipitia lineari-lanceolata acuminata apicem versus sterilia abeuntibus, scaphidiis distichis oppositis, vesiculis sphæricis paucis. (TAB. CVIII.)

HAB. Foveaux Straits, *Lyall.*

Stem 2–3 feet long, nearly terete at the base, more compressed, but not at all two-edged upwards, preserving a diameter of nearly 2 lines throughout, smooth, or furrowed longitudinally (when dry), slightly angular, rather flexu-ous, distichously branched; bipinnate in the lower part, subtripinnate above. *Branches* alternate, an inch or more

asunder, issuing from the margin, patent but not quite horizontal, 4–6 inches long, terete below, subcompressed upwards, naked and margined with distichous wart-like projections (the bases of fallen branches) in the lower part; alternately branched above. *Ramuli* or pinnules distichous, two or three inches long, flattened, tapering to the base, alternately dentate; the barren ones with simple, blunt teeth, the fertile having each tooth prolonged into a pedicellate receptacle. *Receptacles* on short stalks, plano-compressed, two-edged and furrowed down the middle, oblong, the lower half containing a double row of opposite *scaphidia*, whose pores open distichously along the edge; the upper half prolonged into a barren, broadly subulate acumination. *Vesicles* half an inch in diameter, globose, on stalks half their own length, one or more on each of the branches. *Colour* black when dry.—A very noble species, most related to *C. Platylobium*, J. Ag., with which we have not had the opportunity of comparing it.—Plate CVIII. Fig. 1, part of the stem, and a branch, *natural size;* 2, receptacle; 3, enlarged portion of the same, cut across, to show the opposite distichous scaphidia; 4, a spore; 5, paranemata and antheridia:—*more or less magnified.*

Gen. IX. XIPHOPHORA, *Mont.*

(Mont. Voy. Pôle Sud, p. 55. *Fucodium* (*partim*), J. Ag. Sp. Alg. i. 202.)

1. Xiphophora *Billardieri*, Mont., *Pôle Sud, t.* 7. *f.* 1. *Hook. fil. et Harv. Fl. Ant. p.* 176. *t.* 69. *f.* 3. Fucodium gladiatus, *J. Ag. Sp. Alg. v.* 1. *p.* 202. Himanthalia gladiata, *Kütz. Sp. Alg. p.* 587. Fucus gladiatus, *Labill. Pl. N. Holl. p.* 3. *t.* 256. *Turn. Hist. t.* 240.

Hab. Lyall's Bay, Cook's Straits, *Lyall.* Bay of Islands, *Sinclair, Lyall, Hooker, Raoul, etc.*

2. Xiphophora *chondrophylla,* Mont. Fucodium chondrophyllus, *J. Ag. Sp. Alg. v.* 1. *p.* 203. Fucus chondrophyllus, *R. Br. in Turn. Hist. t.* 222. *Aresch. Iconogr. t.* 1.

Hab. New Zealand, *D'Urville.* Banks' Peninsula, *Lyall.* (Native of New Holland.)

Gen. X. HORMOSIRA, *Endl.*

(Endl. Gen. Pl. p. 10; Suppl. iii. 29. J. Ag. Sp. Alg. i. 197. Kütz. Sp. Alg. p. 586. *Moniliformia,* Lamour. Dict. Class. vii. 71. Grev. Syn. p. xxxvi. *Monilia,* A. Rich. N. Zel. p. 13.)

1. Hormosira *Labillardieri,* Mont., *Pôle Sud, p.* 62. *J. Ag. Sp. Alg. v.* 1. *p.* 199. *Kütz. Sp. Alg. p.* 586. *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 528. Fucus moniliformis, *Labil. Pl. N. Holl. t.* 262.

Hab. Wangari Bay, *D'Urville.* Bay of Islands, etc., *Hooker, Lyall, Colenso, etc.* (Native of New Holland.)

2. Hormosira *Sieberi,* J. Ag., *Sp. Alg. v.* 1. *p.* 199. Moniliformia Sieberi, *Bory, Coqu. p.* 134. *A. Rich. N. Zel. v.* 2. *p.* 139.

Hab. New Zealand, *D'Urville, Lyall.* Parimahu, *Colenso.* (Native of New Holland.)

Gen. XI. SPLACHNIDIUM, *Grev.*

(Grev. Syn. p. xxxvi. J. Ag. Sp. Alg. i. 186. Kütz. Sp. Alg. p. 585.)

1. Splachnidium *rugosum,* Grev. *J. Ag. Sp. Alg. v.* 1. *p.* 186. *Kütz. Sp. Alg. p.* 585. *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 528. Fucus rugosus, *Linn. Mant. p.* 311. *Turn. Hist. t.* 185. *A. Rich. N. Zel. p.* 141.

Hab. New Zealand, *Lesson.* Akaroa, *Raoul.* Cape Kidnapper, *Colenso.* Port Cooper, Banks' Peninsula, *Lyall.* (Native of South Africa and New Holland: "East Indies," *Vahl.*)

Gen. XII. NOTHEIA, *Bail. et Harv.*

(Bail. et Harv. Bot. of Wilkes' American Expl. Exp. ined.)

Frons (parasitica) filiformis, vage ramosa, prolifera, solida. *Scaphidia* per totam frondem sparsa, in

strato corticali infra superficiem excavata, sphærica, cum ostiolo superficiali per canalem communicantia. *Sporæ* intra perisporium hyalinum lineari-obovatum parietale nidulantes. *Paranemata* simplicia.—Alga *parasitica, pusilla, organis nullis discretis, quasi receptaculis* Cystoseiræ *vel* Sargassi *habitu referens.*

1. Notheia *anomala,* Bail. et Harv. (Tab. CIX. *A.*)

Hab. Parasitical on *Hormosira,* New Zealand, *Wilkes.* Port Cooper, Banks' Peninsula, *Lyall.* Parimahu, *Colenso.*

Frond 2–3 inches high, twice as thick as hog's-bristle, filiform, slightly tapering to the base and apex, curved, undivided, set with lateral branches, which arise from all sides; each branch springing proliferously from one of the *scaphidia* of an older branch or portion of the primary frond. In this way the frond at length becomes decompound and bushy, the series of branches being successively smaller, the youngest fusiform and mostly arched. *Scaphidia* scattered abundantly through all parts of the frond, sunk in the cortical layer, spherical, opening by rather large superficial pores. *Spores* in very narrow, almost linear, parietal perispores. *Colour* a clear olive. *Substance* subcoriaceous.

A curious little plant, allied to *Splachnidium* and *Hormosira,* but differing from both in habit and parasitic attachment. It much resembles a very branching tuft of *receptacles* of some *Sargassum* or *Cystoseira,* if we can conceive those to be developed without a frond. We have received it from several correspondents; and it would seem to be of frequent occurrence, though not noticed previous to the American Exploring Expedition under Wilkes.—Plate CIX. *A.* Fig. 1, plant, parasitic upon *Hormosira Sieberi, nat. size;* 2, branches of the parasite; 3, section of a branch; 4, section of a *scaphidium,* immersed in the branch, with spores and paranemata:—*more or less magnified.*

Gen. XIII. D'URVILLÆA, *Bory.*

(Bory, Dict. Class. ix. 192. Voy. Coqu. p. 65. J. Ag. Sp. Alg. i. 187. Kütz. Sp. Alg. p. 585.)

1. D'Urvillæa *utilis,* Bory, *Coqu. p.* 65. *t.* 1, *et t.* 2. *f.* 1. *A. Rich. Fl. N. Zel. p.* 8. *Post. et Rupr. Illustr. t.* 1. *Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 176. *v.* 2. *p.* 454. *Lond. J. Bot. v.* 4. *p.* 528. *J. Ag. Sp. Alg. v.* 1. *p.* 188. *Kütz. Sp. Alg. p.* 585.

Hab. New Zealand, *D'Urville, Hooker, etc.* (Native of Antarctic regions, and extra-tropical South America.)

Tribe II. *SPOROCHNACEÆ.*

Gen. XIV. SPOROCHNUS, *Ag.*

(Kütz. Phyc. Gen. p. 342. J. Ag. Sp. Alg. i. 173. Kütz. Sp. Alg. p. 568.)

1. Sporochnus *stylosus;* caule filiformi indiviso lateraliter ramoso, ramis sparsis fasciculatisve simplicibus elongatis, receptaculis sessilibus v. brevissime pedicellatis elliptico-oblongis demum cylindraceis mucrone stylomorpho elongato capitato coronatis. (Tab. CIX. *B.*)

Hab. Otago Harbour and Foveaux Straits, *Lyall.*

This has the aspect of *S. pedunculatus,* but is readily distinguished by the receptacles, which are subsessile, cylindrical, and crowned by a long, filiform, style-like mucro, from half to two-thirds the length of the full-grown receptacle.—Plate CIX. *B.* Fig. 1, plant, *natural size;* 2, 3, portions of a branch, with receptacles in various stages of growth; 4, sporiferous filaments from the same:—*more or less magnified.*

Gen. XV. CARPOMITRA, *Kütz.*

(Kütz. Phyc. Gen. p. 343. J. Ag. Sp. Alg. i. 177. Kütz. Sp. Alg. p. 569.)

1. Carpomitra *Halyseris,* Hook. fil. et Harv. *in Lond. J. Bot. v.* 4. *p.* 528. *J. Ag. Sp. Alg. v.* 1. *p.* 179. *Kütz. Sp. Alg. p.* 570.

Hab. Bay of Islands, *Cunningham, Sinclair, Lyall, J. D. H., etc.*

We fear this can only be regarded as a broader and more distinctly midribbed form of *C. Cabreræ.*—Plate CX. *A.* Fig. 1, plant, *natural size;* 2, small portion of frond, with two terminal receptacles; 3, section of a receptacle; 4, sporiferous filaments from the same:—*more or less highly magnified.*

2. Carpomitra *Cabreræ,* Kütz., *Phyc. Gen. p.* 343. *J. Ag. Sp. Alg. v.* 1. *p.* 177. *Harv. Phyc. Brit. t.* 14. *Kütz. Sp. Alg. p.* 569. Fucus Cabrera, *Clem. Turn. Hist. t.* 140.

Hab. Lyall's Bay, Cook's Straits, *Lyall.* Hawke's Bay, *Colenso.* (Native of Atlantic shores of Spain, south of England, and south of Ireland.)

Gen. XVI. DESMARESTIA, *Lamour.*

(Lamour. Ess. p. 23. Endl. Gen. Pl. Sup. 3. p. 28. Kütz. Sp. Alg. p. 570. Harv. Man. ed. 2. p. 23. J. Ag. Sp. Alg. i. 165. *Dichloria,* Grev. J. Ag. Sp. Alg. i. 164.

1. Desmarestia *ligulata,* Lamour. *J. Ag. Sp. Alg. v.* 1. *p.* 169. *Kütz. Sp. Alg. p.* 572. *Harv. Phyc. Brit. t.* 115. *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 467. Fucus ligulatus, *E. Bot. t.* 1636. *Turn. Hist. t.* 98, *etc.*

Hab. New Zealand, *Colenso.* Akaroa, *Lyall.* (Native of shores of Europe, west coast of North America, Chili, Cape Horn, and Cape of Good Hope.)

Tribe III. *LAMINARIACEÆ.*

Gen. XVII. MACROCYSTIS, *Ag.*

(Ag. in Act. Leop. xix. i. 281. J. Ag. Sp. Alg. i. 153. Kütz. Sp. Alg. p. 582.)

1. Macrocystis *pyrifera,* Ag., *Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 177, *v.* 2. *p.* 461. Macrocystidis omnes species, *J. Ag. Sp. Alg. p.* 155–158 (*excl.* M. obtusa = Phyllospora Menziesii, *var.*). *Kütz. Sp. Alg. p.* 582–584. Fucus pyriferus, *Turn. Hist. t.* 110.

Hab. Shores of New Zealand, common. (Native of the Pacific and Southern Oceans.)

We have received several varieties from New Zealand; among others, that remarkable form called *M. Dubenii,* Aresch., with subcylindrical vesicles, 6–8 inches long.

Gen. XVIII. LESSONIA, *Bory.*

(Bory, Voy. Coq. p. 75. J. Ag. Sp. Alg. i. 149. Kütz. Sp. Alg. p. 581.)

1. Lessonia *fuscescens,* Bory, *Voy. Coq. p.* 75. *t.* 2. *f.* 2 *et t.* 3. *Post. et Rupr. t.* 3. *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 457. *t.* 167, 168. *f. A. et t.* 171. *f. D. J. Ag. Sp. Alg. v.* 1. *p.* 151. *Kütz. Sp. Alg. p.* 581.

Hab. New Zealand, *Colenso.* Lyall's Bay, Cook's Straits, *Lyall.* (Native of Antarctic shores, and coast of South Chili.)

Gen. XIX. ECKLONIA, *Hornem.*

(Hornem. in Dansk. Vidensk. Skrift. iii. (1828) 370. Post. et Rupr. Alg. p. 2. J. Ag. Sp. Alg. i. 144. Kütz. Sp. Alg. p. 586. *Capea,* Mont. An. Sc. Nat. 1840. Hook. fil. et Harv. in Lond. J. Bot. iv. 528. Fl. Ant. ii. 466. Kütz. Sp. Alg. p. 578.)

1. Ecklonia *radiata,* J. Ag., *Sp. Alg. v.* 1. *p.* 146. Capea radiata, *Endl. 3rd Suppl. p.* 27. *Kütz. Sp. Alg. p.* 578. *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 528. Fucus radiatus, *Turn. Hist. t.* 134.

Hab. New Zealand, *D'Urville.* (Native of New Holland.)

2. Ecklonia *exasperata,* J. Ag., *Sp. Alg. v.* 1. *p.* 146. Capea biruncinata, *Mont. Canar. p.* 140. *t.* 7.

Hook. fil. et Harv. Fl. Ant. v. 2. p. 466. Laminaria radiata, β exasperata, *Ag. Syst. p.* 271. Laminaria Cunninghamii, *Grev. MSS.*

HAB. New Zealand, *D'Urville, Cunningham, J. D. H., etc.* (Native of New Holland, Chili, Cape of Good Hope, *Zeyher;* and Canary Islands.)

3. Ecklonia *Richardiana,* J. Ag., *Sp. Alg. v.* 1. *p.* 147. Capea Richardiana, *Kütz. Sp. Alg. p.* 578.

HAB. New Zealand, *Herb. A. Rich.* Hawke's Bay, *Colenso.* (Native of New Holland.)

4. Ecklonia *flabelliformis,* J. Ag., *Sp. Alg. v.* 1. *p.* 147. Capea flabelliformis, *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 528. Laminaria flabelliformis, *A. Rich. Fl. N. Zel. t.* 1, 2.

HAB. Wangari Bay, *D'Urville.* Bay of Islands, *J. D. H.*

Gen. XX. CHORDA, *Stackh.*

(Lamour. Ess. p. 26. Lyngb. Hyd. Dan. p. 72. Grev. Alg. Brit. p. 46. Harv. Phyc. Brit. t. 107, 285. Kütz. Sp. Alg. p. 548. *Scytosiphon,* Endl. 3rd Suppl. p. 25. J. Ag. Sp. Alg. i. 125.)

1. Chorda *Lomentaria,* Lyngb., *Hyd. Dan. p.* 74. *t.* 18. *Harv. Phyc. Brit. t.* 285. *Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 179. *v.* 2. *p.* 468. Scytosiphon lomentarium, *J. Ag. Sp. Alg. v.* 1. *p.* 126.

HAB. New Zealand, *Colenso.* Waitemata Harbour, *Lyall.* (Native of Atlantic and Pacific, in the temperate zone.)

Gen. XXI. ADENOCYSTIS, *Hook. fil. et Harv.*

(Fl. Ant. i. 179. J. Ag. Sp. Alg. i. 124. *Chordæ* sp., Kütz. *Asperococci* sp., Bory.)

1. Adenocystis *Lessonii,* Hook. fil. et Harv., *Fl. Ant. p.* 179. *J. Ag. Sp. Alg. v.* 1. *p.* 124. Asperococcus Lessoni, *Bory, Coq. t.* 2. *f.* 2. Chorda Lessonii, *Kütz. Sp. Alg. p.* 549.

HAB. Bay of Islands, *Sinclair.* Port Cooper, Banks' Peninsula, *Lyall.* (Native of the Antarctic shores.)

TRIBE IV. *DICTYOTACEÆ.*

Gen. XXII. ZONARIA, *J. Ag.*

(J. Ag. Symb. in Penn. xv. 444. Endl. Gen. Sup. 3. p. 25. J. Ag. Sp. Alg. i. 106. *Zonariæ* sp., Ag. *Stypopodii* sp., et *Phycopteris,* Kütz. Sp. Alg. p. 563, 564.)

1. Zonaria *interrupta,* Ag., *Sp. Alg. v.* 1. *p.* 137. *J. Ag. Sp. Alg. v.* 1. *p.* 3. Zonaria flava, *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 529 (*excl. syn.*). Phycopteris interrupta, *Kütz. Sp. Alg. p.* 564. Fucus interruptus, *Turn. Hist. t.* 245.

HAB. Common on the shores of New Zealand, *Colenso, Lyall, etc.* (Native of New Holland and South Africa.)

The specimens formerly referred by us to *Z. flava,* Ag., appear to belong to this species, but are of a pale yellow colour and probably bleached.

2. Zonaria *Sinclairii,* Hook. fil. et Harv. *in Lond. J. Bot. v.* 4. *p.* 530. *J. Ag. Sp. Alg. v.* 1. *p.* 111. Stypopodium Sinclairii, *Kütz. Sp. Alg. p.* 564.

HAB. New Zealand, *Sinclair.*

3. Zonaria *velutina,* Harv.; fronde erectiuscula, stipite brevi crasso stuposo in laminas flabelliformes subsimplices demum apice multifidas subtus nigrescenti-velutinas supra glaberrimas abeunte, soris . . . ?

HAB. East Coast, *Colenso.* Milford Haven and Port Cooper, *Lyall.*

Fronds densely tufted, 1–2 inches high, not much branched. *Stipites* scarcely half an inch long, densely stupose, widening into the base of a broadly flabelliform, undivided or vertically cleft frond; the subdivisions flabelliform. The upper surface of the lamina is quite smooth, the lower almost wholly covered, except at the apices and for a narrow space round the margin, with blackish-brown, velvety stupa.—This has the aspect of *Z. multifida*, and is of the same size; but is readily known by the dense velvety coating of the under surface. We are not acquainted with *Z. stuposa*, J. Ag., which is said to be stupose on *both* surfaces ("utrinque").

Gen. XXIII. DICTYOTA, *Lamour.—J. Ag.*

(J. Ag. Sp. Alg. i. 86. Kütz. Sp. Alg. p. 553. Harv. Phyc. Brit., etc.)

1. Dictyota *Kunthii*, Ag., *Ic. Ined. t.* 15. *J. Ag. Sp. Alg. v.* 1. *p.* 94. *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 530. *Kütz. Sp. Alg. p.* 556.

Hab. Abundant on the New Zealand coast, *Lyall, J. D. H., Colenso, etc.* (Native of Chili.)

2. Dictyota *dichotoma*, Lamour. *J. Ag. Sp. Alg. v.* 1. *p.* 92. *Kütz. Sp. Alg. p.* 554. *Harv. Phyc. Brit. t.* 103. Ulva dichotoma, *E. Bot. t.* 774.

Hab. Hawke's Bay, *Colenso.* Dredged in eight fathoms, Queen Charlotte's Sound, *Lyall.* (Native of Northern Atlantic; Mediterranean; Red Sea; Gulf of Mexico; and Cape of Good Hope.)

Gen. XXIV. ASPEROCOCCUS, *Lamour.*

(Lamour. Ess. p. 61. Grev. Syn. p. 42. J. Ag. Sp. Alg. i. 74. *Encœlium*, Ag. Sp. i. 144. *Encœlium* et *Haloglossum*, Kütz. Sp. Alg. pp. 551–561.)

1. Asperococcus *sinuosus*, Bory, *J. Ag. Sp. Alg. v.* 1. *p.* 75. *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 468. Encœlium sinuosum, *Ag. Syst. p.* 262. *Kütz. Sp. Alg. p.* 552.

Hab. Otago, *Lyall.* Cape Kidnapper and Cape Turnagain, *Colenso.* (Native of South of Europe, bays of Florida, Brazil, Cape of Good Hope, Mauritius, Red Sea, New Holland, Falkland Islands.)

Tribe V. *CHORDARIACEÆ.*

Gen. XXV. SCYTOTHAMNUS, *Hook. fil. et Harv.*

(Hook. fil. et Harv. in Lond. J. Bot. iv. 531. J. Ag. Sp. Alg. i. 63. Kütz. Sp. Alg. p. 546. *Chordariæ* sp., J. Ag. Symb. p. 47.)

1. Scytothamnus *australis*, Hook. fil. et Harv., *Lond. J. Bot. p.* 531. *J. Ag. Sp. Alg. v.* 1. *p.* 64. *Kütz. Sp. Alg. p.* 547. Chordaria australis, *J. Ag. Symb. v.* 1. *p.* 47.

Hab. On tidal rocks, very common, *Lyall, Colenso, J. D. H., Sinclair, etc.*

A most variable plant in ramification, sometimes nearly simple, sometimes excessively branched and bushy; two to twelve inches long, or more.

Gen. XXVI. CHORDARIA, *Ag.*

(Ag. Sp. Alg. i. 164. J. Ag. Sp. Alg. i. 64. Kütz. Sp. Alg. p. 546.)

1. Chordaria *sordida*, Bory; caule indiviso brevi vel elongato lateraliter ramoso, ramis creberrime alternis sparsisve elongatis simplicibus nunc alterne ramuliferis villo elongato olivaceo-virescente velatis, filis periphericis elongatis viridibus cylindraceo-moniliformibus, articulis diametro vix longioribus, sporis ellipsoideis parvis.—Chordaria sordida, *Bory, Coq. p.* 139? Mesogloia Brasiliensis, *Mont. Pl. Cell. Exot.*

v. 4. *n.* 68? Mesogloia Natalensis, *Kütz.! Bot. Zeit.* 1847, *p.* 53. Mesogloia Vogelii, *Harv.! Herb. Hook. MSS.* Myriocladia Capensis, *J. Ag.! Sp. Alg. v.* 1. *p.* 54. Nemalion Natalense, *Hering! Regensb. Flora,* 1846. Thorea Americana, *Kütz. Phyc. Gen. p.* 326. *Sp. Alg. p.* 534. Chordaria villosa, *Harv. in Herb.*

HAB. On rocks: Tory Channel, Cook's Straits, *Lyall.* Parimahu, *Colenso.* (Native of east and west coast of Africa, and South America.)

Frond 1–2 feet long, flaccid, cartilagineo-gelatinous, closely adhering to the paper in drying. Main *stem* either very short and stipitiform, throwing up numerous, long, simple branches; or elongate and laterally branched throughout, the lowest branches short, the upper long and filiform. *Branches* simple, flagelliform, either destitute of ramuli or more or less thickly furnished with short, horizontally divaricate branchlets, of various lengths. The young frond is in every part densely covered with olivaceous villosity, 1–2 lines long, composed of very slender, articulated, cylindrical filaments, with very short articulations. These villous filaments are deciduous, being thrown off in proportion as the stratum of true peripheric filaments (which are moniliform) is developed. The frond eventually becomes stripped; but as the peripheric filaments are also long and rather loosely set, it preserves in some degree a villous character. Old specimens strongly resemble *Mesogloia virescens* to the naked eye. Very old specimens, again, are completely bare, and scarcely to be known from a very robust state of *C. flagelliformis.*

A widely dispersed plant, if, as we have good reason to believe, all the above-quoted synonyms belong to it. It appears to us to be a true *Chordaria;* though referred by J. Agardh to *Myriocladia*, by Montagne to *Mesogloia*, and by Kützing to *Thorea.* We have it from Senegambia (*Vogel*); Table Bay (*W. H. H.*); Port Natal (*Krauss*); besides the above-quoted New Zealand specimens.

Gen XXVII. MESOGLOIA, *Ag.*

(J. Ag. Sp. Alg. i. 56. Kütz. Sp. Alg. p. 544. Harv. Phyc. Brit. t. 31. t. 82.)

1. Mesogloia *intestinalis,* Harv.; fronde a basi gracili sursum sensim incrassata intestiniformi subsimplici vel vage ramosa, ramis paucis similibus obtusis junioribus tomentosis, filis periphericis fasciculatis elongatis cylindraceo-clavatis subliberis, articulis diametro brevioribus v. æqualibus, sporis elliptico-oblongis aggregatis.

HAB. Blind Bay, Cook's Straits, and Auckland; also Otago Harbour, *Lyall.*

Frond 1–2 feet long or probably more, a line in diameter at the base, gradually widening upwards, and at length nearly half an inch in diameter, which thickness is then preserved throughout. *Branches* few and very irregular in position and size, similar to the main stem, obtuse; the whole frond clothed with villous filaments extending beyond the periphery. The axial filaments are loosely bundled and branched, like those of *M. virescens;* the peripheric are fasciculate, cylindrical, slightly widened upwards, of various lengths in the same fascicle, not moniliform, and more resemble those of an *Elachista* than of a *Mesogloia.* Their lower articulations are very short, the upper gradually longer, but the uppermost alone attain a length a little exceeding their diameter. *Spores* oblong, two or more in each fascicle, sessile. *Substance* very soft. We have seen very few specimens of this seemingly well characterized species.

Gen. XXVIII. LEATHESIA, *Gray.*

(Gray, Br. Pl. i. 301. Endl. 3rd Suppl. p. 23. Harv. Phyc. Brit. J. Ag. Sp. Alg. i. 50. Kütz. Sp. Alg. p. 543. *Corynophlæa*, Kütz. l. c.)

1. Leathesia *Berkeleyi,* Harv., *Phyc. Brit. t.* 176. *J. Ag. Sp. Alg. v.* 1. *p.* 51. Chætophora Berkeleyi, *Grev. in Berk. Gl. Alg. t.* 1. *f.* 2. *Wyatt, Alg. Danm. W.* 231.

HAB. Tidal rocks, near Cape Kidnapper, *Colenso.* (Native of British seas.)

Tribe VI. *ECTOCARPACEÆ.*

Gen. XXIX. SPHACELARIA, *Lyngb.*

(Lyngb. Hyd. Dan. p. 103. J. Ag. Sp. Alg. i. 29. *Sphacelaria, Stypocaulon*, et *Halopteris*, Kütz. Sp. Alg. pp. 462–468.)

1. Sphacelaria *paniculata*, Suhr, *Beitr. in Flora*, 1840, *p.* 278. *J. Ag. Sp. Alg. v.* 1. *p.* 36. S. hordeacea *et* S. virgata, *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 530. *Hook. Ic. Pl. t.* 614. Stypocaulon paniculatum, S. hordeacum, *et* S. virgatum, *Kütz. Sp. Alg. p.* 467.

Hab. Shores of New Zealand, abundantly. (Native of New Holland.)

A very variable plant in size, aspect, and ramification; and also in the appearance of its fructification. We have before us specimens producing the terminal spikelets of spores, as figured in Hook. Ic. Pl. t. 614; others which bear favelloid tubercles, filled with obconical spores, also in terminal spikelets; and lastly, others with dense tufts of grumous cells, crowded in the axils of the uppermost ramuli, but not in terminal spikes. The *S. virgata* of our former list is a slender variety, with longer, simpler, and more rod-like branches.

2. Sphacelaria *funicularis*, Mont., *Voy. Pôle Sud, t.* 14. *f.* 1. *Hook. fil. et Harv. in Fl. Ant. v.* 1. *p.* 180. *Lond. J. Bot. v.* 4. *p.* 531. *J. Ag. Sp. Alg. v.* 1. *p.* 38. Stypocaulon funiculare, *Kütz. Sp. Alg. p.* 467.

Hab. Akaroa, *Hombron, Lyall.* East Coast, *Colenso.* (Native of Antarctic shores.)

We do not always find it easy to distinguish between the present species and some of the shorter and stouter varieties of *S. paniculata.*

3. (?) Sphacelaria *botryoclada,* Hook. fil. et Harv.; fronde (denudata tantum visa) inarticulata estuposa vage ramosa v. subdichotoma, ramis flexuosis simplicibus elongatis per totam longitudinem fasciculis ramellorum fertilium densissime obsessis, fasciculis sphæricis quaquaversum egredientibus, ramellis incurvis dichotome multifidis sporas sessiles laterales ellipticas ferentibus. (Tab. CX. *B.*)

Hab. East Coast and Cook's Straits, *Lyall.*

Our knowledge of this plant is confined to two specimens, both evidently imperfect, and therefore, notwithstanding its apparently very distinct characters, we have considerable hesitation in proposing it as a new species. In the structure of the stem, which, in our specimens, is devoid of stupose fibres, it accords with *Cladostephus*, and the general habit is very like that of *C. verticillatus* in its winter dress. The spherical tufts of ramelli are altogether peculiar, and are evidently special fructiferous processes; a fact made obvious by one of our specimens exhibiting at the end of one of its branches ordinary sphacelarioid ramuli; so like those of *S. paniculata*, that, preposterous though it may seem, we are not without doubts whether the plant now described be not merely a *fourth* state of *S. paniculata*, with another development of spores!—Plate CX. *B.* Fig. 1, plant, *the natural size;* 2, part of a branch with clusters of sporiferous ramuli; 3, sporiferous ramuli, separated; 4, apex of one of the ramuli; 5, cross section of the stem:—*more or less magnified.*

4. Sphacelaria *pulvinata,* Hook. fil. et Harv.; parasitica, cæspitibus minutis hemisphæricis densis, filis rigidis arcuatis apice sphacelatis simplicibus v. parum ramulosis, ramulis erectis sæpissime secundis, sporis elliptico-oblongis pedicellatis secundis raro oppositis, articulis subtrivenosis diametro sesquilongioribus.—Ectocarpus? pulvinatus, *Harv. MSS. in Herb.* (Tab. CX. *C.*)

Hab. Parasitic on the margin and on the receptacles of *Carpophyllum Maschalocarpus, Colenso.*

Filaments a line long, arcuate, simple, forming exceedingly dense, globular tufts. *Spores* on secund, rarely opposite pedicels, usually lining the concave side of the filament. When the spore is abortive the pedicel forms a ramulus. *Articulations* once and a half as long as broad, three-tubed. *Colour* a foxy-brown.

This has the *habit*, externally, of *Elachista pulvinata:* but the structure of the rigid filaments is that of *Sphacelaria.*—Plate CX. *C.* Fig. 1, plant, parasitical on *Carpophyllum Maschalocarpus, natural size;* 2, the parasite; 3, a sphacelated apex and pedicellate spore from the same:—*more or less magnified.*

Gen. XXX. ECTOCARPUS, *Lyngb.*

(Lyngb. Hyd. Dan. p. 130. J. Ag. Sp. Alg. i. 14. Kütz. Sp. Alg. p. 449. Also *Corticularia, Spongonema,* and *Tilopteris,* Kütz. l. c. p. 460–462.)

1. Ectocarpus *siliculosus,* Lyngb. *J. Ag. Sp. Alg. v.* 1. *p.* 22. *Kütz. Sp. Alg. p.* 451. *Harv. Phyc. Brit. t.* 162. *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 531.

Hab. Bay of Islands, *J. D. H.* Port Cooper and Port William, *Lyall.* Tauranga, *Davies.* Maketu, *Chapman.* Cape Kidnapper, *Colenso.* (Native of north and south temperate zone.)

2. Ectocarpus *granulosus,* Ag. *J. Ag. Sp. Alg. v.* 1. *p.* 21. *Harv. Phyc. Brit. t.* 200. E. ochraceus, *Kütz. Sp. Alg. p.* 453.

Hab. East Coast, *Colenso.* (Native of shores of Europe and North America.)

3. Ectocarpus *confervoides,* Harv.; cæspite 2–4-unciali, filis elongatis rigidiusculis distanter ramosis, ramis parum divisis, ramulis paucis simplicibus sparsis erectis v. erecto-patentibus, axillis acutis, propagulis elongatis cylindraceis vel filiformibus sæpius ramellos terminantibus nunc in ramis immersis.

Hab. Otago and Blind Bay, Cook's Straits, *Lyall.*

Tufts 2–4 inches long, rather coarse, dense, not closely adhering to paper, greenish-olive when dry. *Filaments* distantly and sparingly branched: the ramuli few, simple, very erect, or somewhat patent. *Axils* all very acute. *Propagula* elongate, generally terminating the branchlets, sometimes imbedded in the middle of the branches.

This is nearly related to *E. siliculosus,* but has the aspect and ramification of *E. crinitus.*

4. Ectocarpus *pusillus,* Griff.?; cæspite unciali, filis tenuibus flaccidis simpliciusculis hic illic ramulos horizontales breves emittentibus, articulis diametro subbrevioribus, propagulis . . . ? (*An* E. pusillus, *Griff. in Harv. Phyc. Brit. t.* 153?)

Hab. Parasitic on Corallines, Hawke's Bay, *Colenso.* (Native of England.)

Very similar in appearance to British specimens of *E. pusillus;* but, until the fructification be discovered, we are uncertain of the propriety of the above reference.

Series II. RHODOSPERMEÆ.

Tribe I. *RHODOMELACEÆ.*

Gen. XXXI. LENORMANDIA, *Sond.*

(Sond. in Pl. Preiss. ii. 183. Harv. Ner. Austr. p. 18. t. 2. Kütz. Sp. Alg. p. 849. (non Mont.)

1. Lenormandia *Chauvinii,* Harv.; phyllodiis brevissime pedicellatis crassiusculis rigidislato-linearibus oblongisve obtusissimis integerrimis nervo tenui evanescente percursis, e nervo proliferis, stichidiis marginalibus v. e nervo enatis simplicibus ramosisve.

Var. *β. angustifolia;* phyllodiis linearibus angustis.

Hab. Otago, *Lyall.* East Coast, *Colenso.* (Native of New Holland.)

Variable in size. In the larger specimens the phyllodia are three inches long and half an inch wide; in the smaller, 1½–2 inches long and 1–2 lines wide. The substance is thickish, rigid when dry, and semi-opaque. The

structure is that of *L. spectabilis*. *Stichidia* either thickly fringing the margin of fertile specimens, or springing from the nerve, lanceolate, simple or multifid. *Colour* "dark purple" (*Colenso*); a dark reddish-brown when dry.

Our first specimens of this plant were received from M. Chauvin, who obtained them from New Holland.

Gen. XXXII. EPINEURON, *Harv.*

(Harv. in Lond. J. Bot. iv. 532. Ner. Austr. p. 25. t. 9, 10. Kütz. Sp. Alg. p. 848.)

1. Epineuron *lineatum*, Hook. fil. et Harv. *in Lond. J. Bot. v. 4. p.* 532. *Harv. Ner. Austr. p.* 27. *Kütz. Sp. Alg. p.* 848. Fucus lineatus, *Turn. Hist. t.* 201.

Hab. New Zealand, *Banks*.

2. Epineuron *Colensoi*, Hook. fil. et Harv., *Lond. J. Bot. v.* 4. *p.* 532. *Harv. Ner. Austr. p.* 26. *t.* 10. *Kütz. Sp. Alg. p.* 849.

Hab. East Coast, *Colenso*. Bay of Islands, *Lyall*.

Gen. XXXIII. AMANSIA, *Lamour.*

(Lamour. Ess. p. 55. Harv. Ner. Austr. p. 24. Kütz. Sp. Alg. p. 882.)

1. Amansia (??) *Marchantioides*, Harv.; fronde horizontaliter expansa inferiore pagina radicante flabelliformi varie lobata prolificationibusque marginalibus ascendentibus extensa tenui-membranacea ecostata transversim parallele zonata striis longitudinalibus radiantibus decussata hexahedre areolata, cellulis oblongis, fructu . . ?

Hab. Cape Kidnapper and Hawke's Bay, on tidal rocks, *Colenso*.

Frond at first prostrate, emitting rootlets from the whole of the under surface, flabelliform, excentrically expanding in patches an inch or more in diameter, deeply laciniate or pinnatifid, the lobes erecto-patent, crenate, irregularly dentate, and finally lobed at the edges, very variable in breadth and in division; the primary lobes emitting secondary flabelliform frondlets, which lie over the margins of the first, until there results an intricate stratum of imbricated fronds. In more advanced specimens the ultimate laciniæ are destitute of rootlets on the under surface, probably therefore erect, linear, elongate, crenate, dentate or pinnatifid; the margin undulate, and the apices blunt. *Membrane* thin, conspicuously areolated, with diverging, longitudinal, and subconcentric transverse striæ. *Cells* oblong.

Probably very different in aspect when fully grown. Our specimens are evidently immature. We think it also probable that it will eventually be made the type of a separate genus, but are unwilling to found one on such imperfect data.

Gen. XXXIV. ALSIDIUM, *Ag.*

(J. Ag. in Linnæa, xv. 28. Harv. Ner. Austr. p. 30. Harv. Ner. Bor. Amer. pt. 2. p. 15. t. 13 *A. Bryothamnion*, Kütz. Sp. Alg. p. 842.)

1. Alsidium *triangulare*, J. Ag. *in Linn. v.* 15. *p.* 28. *Harv. Ner. Austr. p.* 30. *Ner. Bor. Amer. pt.* 2. *p.* 15. *t.* 13. *f. A.* Bryothamnion triangulare, *Kütz. Sp. Alg. p.* 842. Fucus triangularis, *Gmel. Hist. t.* 8. *f.* 4. *Esper. t.* 119. *Turn. Hist. t.* 33.

Hab. New Zealand, *Banks, fide Turner*. (Native of the Gulf of Mexico and Caribbean Sea.)

Probably some mistake. *A. triangulare* has not of recent years been brought from the southern hemisphere; it is a common West Indian species.

Gen. XXXV. CHONDRIA, *Ag.*

(J. Ag. ref. Harv. in Ner. Bor. Amer. pt. 2. p. 19.)

1. Chondria *macrocarpa*, Harv.; fronde cylindracea filiformi alterne vel pinnatim decomposita subdis-

ticha, ramis nunc strictis virgatis confertis et crebre pinnatis nunc laxioribus curvatis et vage ramulosis, ramulis linearibus basi vix angustatis obtusissimis erecto-patentibus elongatis alternis sparsisve, ceramidiis ovatis magnis lateralibus sessilibus vel terminalibus.

Var. *β*; ramis strictis virgatis crebre pinnatis.

HAB. Foveaux Straits. Var. *β*. East side of the Southern Island, *Lyall.*

Frond 4–6 inches long, filiform, as thick as a sparrow's quill, irregularly much branched, most of the divisions distichous. *Branches* alternate or secund, distant or close together, either virgate and unbranched, but closely set with alternate pinnæ, or curved and distantly alternately compounded. *Ramuli* elongated, ½–1 inch long, simple or alternately ramulose, filiform, very obtuse, slightly constricted at the very base. *Conceptacles* of large size, ovate, either on the ends or at the sides of the ramuli: in the latter case, sessile. Under a pocket-lens the articulated axis may readily be seen, when the branch has not been subjected to strong pressure. It soon decomposes in fresh water, and does not open well, so that the internal structure is not easily seen.

2. Chondria *flagellaris,* Harv.; fronde purpurascente setacea filiformi e basi vage ramosa vel alternatim decomposita, ramis elongatis parum divisis, ramulis sparsis inæqualibus filiformibus acutis vel attenuatis basi nec constrictis, ceramidiis ovato-globosis ore prominulo ad ramos majores sessilibus.

HAB. Port Nicholson, Cook's Straits, and Paterson's Harbour, *Lyall.*

Fronds densely tufted, as thick as a hog's bristle or thicker, branched from the base, twice or thrice alternately or irregularly decompound; the main branches elongate, subsimple, having a few lateral, erecto-patent ramuli. *Ramuli* very unequal in length, long and short intermixed, laxly set, alternate or secund, filiform, acute. *Colour* a dull, livid purple. *Substance* cartilaginous. *Ceramidia* rather large, sessile on the branches, ovate, with a prominent orifice. Structure dense, but with an evident axial circle of cells.

Gen. XXXVI. RYTIPHLÆA, *Ag.*

(J. Ag. in Linnæa, xv. 26. Harv. Ner. Austr. p. 31. Harv. Ner. Bor. Amer. pt. 2. p. 28. Phyc. Brit. t. 85, 170, 220, 221. Kütz. Sp. Alg. p. 844. *Halopithys,* Kütz. Sp. Alg. p. 840.)

1. Rytiphlæa *pinastroides,* J. Ag. *Harv. Phyc. Brit. t.* 85. Halopithys pinastroides, *Kütz. Sp. Alg. p.* 840. Fucus pinastroides, *Turn. Hist. t.* 11. *E. Bot. t.* 1042.

HAB. New Zealand, *Banks, fide Turner.* (Native of Europe and Canary Islands.)

Probably some mistake.

2. Rytiphlæa *delicatula,* Hook. fil. et Harv.; fronde setacea tereti transversim pellucide striata disticha flabelliformi in parte inferiore ramulosa sursum pinnato-decomposita, ramis corymboso-fastigiatis extra medium pinnatis bi-pinnatisve, ramulis alternis subulatis patentibus simplicibus versus apicem densioribus compositisque, interstitiis striarum diametro sesquilongioribus cellulis multangulis corticatis, axi tetrasiphonio, ceramidiis ovatis sessilibus sparsis. (TAB. CXII. *D.*)

HAB. Dredged in five fathoms, D'Urville Island, and Blind Bay, Cook's Straits; also at Akaroa, *Lyall.*

Tufted, 2 inches high, flabelliform, distichously pinnate above the middle; the pinnæ corymbose, and in the larger specimens once or twice decompound. All the divisions are margined with subulate, patent ramuli, closer together towards the tips of the branches, and there alternately decompound. When examined with a pocket-lens, the stem appears, articulated (as in *Polysiphonia*), owing to the thinness and transparency of the cortical layer; but the microscope shows that every part, even the youngest ramuli, is coated with accessory cellules. There are four large tubes in the axis, surrounding a small central tube. *Conceptacles* ovate, sessile on the larger pinnæ.—PLATE CXII. *D.* Fig. 1, plant, *natural size;* 2, branch from the same; 3, a ramulus; 4, section of a branch; 5, a ceramidium:—*all more or less magnified.*

Gen. XXXVII. RHODOMELA, *Ag.*

(Ag. Syst. p. 196. Grev. Alg. Brit. p. 102. Harv. Phyc. Brit. t. 50, 264. Harv. Ner. Austr. p. 34. *Lophura*, Kütz. Sp. Alg. p. 850.)

1. Rhodomela *Gaimardi*, Ag. *Bory, Coq. p.* 215. *t.* 22. *f.* 1. *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 481. *t.* 184. *Harv. Ner. Austr. p.* 35. Lophura Gaimardi, *Kütz. Sp. Alg. p.* 851.

HAB. Akaroa, Blind Bay, and Cook's Straits, *Lyall.* Hawke's Bay, *Colenso.* (Native of Antarctic shores.)

2. Rhodomela *cæspitosa*, Harv.; dense cæspitosa, bi-triuncialis, fronde tereti ultrasetacea alterne decomposita subfastigiata, ramis creberrimis arcuatis vage divisis ramulisque lineari-subulatis sparsis secundis alternisve plus minus obsessis, stichidiis lineari-subulatis densissime glomerulatis, glomerulo ad latera ramorum sessili.

HAB. On rocks near low-water mark; Occepoto and Parimahu, *Colenso.*

Fronds one or two inches high, perhaps more, densely tufted. *Stem* naked below, once or twice forked, densely and very irregularly branched above; the outline flabelliform, and the branches subfastigiate. *Branches* without order, frequently secund, sometimes spreading to all sides, irregularly twice or thrice compounded; the ultimate ramuli linear-subulate, elongate, arched, acute; coated with small cells, and quite opaque under the microscope, but the articulations of the axis visible through the cortical layer, when examined with a pocket-lens. *Axial* tubes four. *Stichidia* forming very dense glomeruli two lines in diameter, on the sides of the upper branches, linear-subulate like the ramuli, somewhat distorted, and either simple or branched, containing a wavy line of tetraspores.

"Densely cæspitose, in beds, and of a bright emerald-green colour," *Colenso.*—Allied to *R. Gaimardi*, but smaller, and more densely and irregularly branched. It differs in many respects from the description given of *R. glomerulata*, Mont.; but further we cannot say.

3. Rhodomela *concinna*, Hook. fil. et Harv.; radice discoidea stuposa, fronde elata disticha alterne pinnato-decomposita (tri-quadripinnata), pinnis minoribus linearibus elongatis pinnulatis, pinnulis æquilongis brevibus dichotomo-multifidis, ramulis quaquaversis subulatis sæpe furcatis, stichidiis oblongis acutis ad latera ramulorum sessilibus tetrasporas pluriseriatas foventibus. (TAB. CXI.)

HAB. Middle Island: Foveaux Straits, and Chalky Bay, West Coast, *Lyall.*

Frond 8–12 inches high, as thick as sparrow's quill, many times distichously pinnate, ovate in outline; the lower main branches subhorizontal; the upper erecto-patent, twice or thrice pinnate-decompound. Penultimate pinnæ $\frac{1}{2}$–$1\frac{1}{2}$ inch long, set with alternate, dichotomously multifid pinnules, 1–2 lines long, and nearly of equal size throughout the rachis. These are distichously inserted along the rachis, but their own divisions branch in all directions; the apices divaricating and spine-like. On the multifid ramuli the stichidia are borne. Every part of the frond is opaque, coated with minute cortical cells.—PLATE CXI. Fig. 1, plant, *natural size;* 2, apex of a branch, with ramuli; 3, a multifid ramulus, bearing stichidia; 4, a stichidium *in situ*, enlarged:—*all more or less magnified.*

Gen. XXXVIII. BOSTRYCHIA, *Mont.*

(Mont. Hist. Cuba, Bot. p. 39. Harv. Phyc. Brit. t. 48. Harv. Ner. Austr. p. 58. Kütz. Sp. Alg. p. 839. *Helicothamnion*, Kütz. Phyc. Gen. p. 433. *Stictosiphonia*, Fl. Ant. ii. 483. t. 186. f. 1, 2.)

1. Bostrychia *mixta*, Hook. fil. et Harv., *Lond. J. Bot. v.* 4. *p.* 270. *l. c. p.* 539. *Harv. Ner. Austr. p.* 70. *Kütz. Sp. Alg. p.* 840.

HAB. Rocks near high-water mark, Bay of Islands, *J. D. H.* Otago, *Lyall.* (Native of South Africa.)

2. Bostrychia *Harveyi*, Mont.; fronde tereti biunciali setacea dichotomo-pinnata, ramis flexuosis pin-

natis sæpe furcatis apicibusque involutis, pinnis alternis simpliciter pinnellatis, pinnellis 3–4 lineari-filiformibus gracilibus obtusis, stichidiis elongatis in medio vel apice pinnellarum evolutis.—*Mont. in Fl. Chil.*

HAB. On rocks covered by the sea at high water, Paterson's Harbour, *Lyall.* (A native of Chili.)

Fronds 2–3 inches high, as thick as a hog's bristle, three to four times irregularly forked, and set throughout with lateral, distichous, simply pinnate, patent branchlets, two or three lines long, each bearing from three to five ultimate pinnellæ; ends of the branches curled in. *Stichidia* linear-oblong, acute, sometimes formed from the middle portion, sometimes from the end of the ramuli. *Colour* a blackish-purple.—This appears the same as the *B. Harveyi*, Mont., from Chiloe. At the same time it must be allowed to border very closely on the European *B. scorpioides*, with which I formerly united it; it is, however, more slender than the ordinary state of that species, and the stichidia may possibly afford a valid specific character.

3. Bostrychia *distans*, Harv.; fronde tereti debili bi-triunciali subsetacea vage ramosa v. pinnato-dichotoma, ramis alterne divisis apicibusque involutis pinnatis, pinnis distantibus alternis simplicibus vel pinnellatis, pinnellis 2–3 lineari-filiformibus obtusis.

HAB. In fresh-water streams near Wellington, and on Banks' Peninsula, *Lyall.* River Kowhaia, *Colenso.*

Perhaps only a straggling variety of *B. Harveyi*, but with more simple and distant ramuli, and less curled apices.

4. Bostrychia *Arbuscula*, Harv.; fronde unciali robusta (semilineam diametro) compressa, caule basi ramulis fractis exasperato sursum creberrime ramoso, ramis brevibus bipinnatis, pinnis approximatis, pinnulis subulatis acutis vel mucronatis erectis, axillis omnibus acutissimis apicibusque strictis, cellulis superficialibus minutissimis vix seriatis.

HAB. Otago, *Lyall.*

Frond 1 inch high, very robust for its length, twice or thrice as thick as a hog's bristle, densely tufted, erect. *Stems* naked below, or set with the remains of broken ramuli, densely clothed with short branches beyond the middle. *Branches* erect, closely bipinnate; the pinnæ subulate, mucronulate, and very erect. *Colour* a dull brownish-purple. *Structure* dense, the surface-cells very minute, dot-like, and irregularly set. *Stem* solid, with eight primary, and several rows of secondary cells. *Fruit* unknown. All parts somewhat compressed.

Gen. XXXIX. POLYZONIA, *Suhr.*

(Suhr, in Flora, 1834, p. 739. t. 2. f. 15. Mont. Pôle Sud, p. 134. Fl. Ant. i. 181. Harv. Ner. Austr. p. 70. Kütz. Sp. Alg. p. 881.)

1. Polyzonia *cuneifolia*, Mont. *Pôle Sud, Bot. p.* 143. *Hook. fil. et Harv. in Fl. Ant. v.* 1. *p.* 181. *t.* 76. *Harv. Ner. Austr. p.* 70. *Kütz. Sp. Alg. p.* 882.

Var. *β. bifida*; foliis sæpissime profunde bifidis vel bipartitis, stichidiis ample cristatis.

HAB. Var. *a*, on the roots of large *Algæ*, east coast of Southern Island; and var. *β*, at Port Preservation, west coast, Middle Island, *Lyall.* (Native of Auckland Islands.)

Our var. *β* is a remarkable state of the species, less branched than usual, and, to the naked eye, more densely clothed with leaves. The leaves are very generally cleft nearly to the base into two subequal lobes, but not invariably so.

2. Polyzonia *adiantiformis*, Dcne., *Nouv. An. Sc. Nat. Ser.* 2. *v.* 17. *p.* 363. *Harv. Ner. Austr. p.* 71. *Kütz. Sp. Alg. p.* 881.

HAB. Parasitical on *Marginaria*, *Herb. Paris.*

3. Polyzonia *ovalifolia*, Hook. fil. et Harv.; surculo repente, foliis alternis horizontalibus sessilibus inæquilaterali-ovalibus obtusissimis integerrimis dentatisve. (TAB. CXII. *B.*)

Hab. Parasitical on *Amphiroa corymbosa, Colenso.*

Though our specimens are in a very young state, consisting merely of creeping surculi, such as are found in all the species when immature, we are unwilling to omit this little plant, whose leaves are remarkably different from those of any previously-described species.—Plate CXII. *B.* Fig. 1, plant, parasitic on *Amphiroa corymbosa;* 2, portion of stem with leaves of the parasite; 3, cellular structure of the leaf of the same, *both highly magnified.*

4. Polyzonia *bipartita,* Hook. fil. et Harv.; surculo trisiphonio repente radicante caules erectos (demum ramosos?) distiche foliatos emittente, foliis alternis fere ad basin bipartitis, laciniis applanatis linearibus mucronatis, inferiore horizontali, superiore erecta, e cellulis triseriatis conflatis, quarum mediæ sunt angustiores oblongæ laterales fere quadratæ, stichidiis axillaribus lineari-oblongis apiculatis. (Tab. CXII. *A.*)

Hab. Parasitical on *Carpophyllum Maschalocarpus, Colenso.*

Our specimens are not fully grown, but evidently belong to a very distinct species, to the naked eye strongly resembling *Polysiphonia ceratoclada,* Mont., for which it may easily be overlooked. Under the microscope, however, no two plants can be more different. The *leaves* in our plant are divided nearly to the base into two linear, obtuse or mucronulate lobes, the lower of which is shorter, and spreads horizontally, the upper elongated and erect, each composed of three rows of rectangular cellules, those of the middle row (or midrib?) about twice as long as broad, those of the side rows nearly square. *Stichidia* of large size, containing a few large tetraspores in a single row.—Plate CXII. *A.* Fig. 1, plant, growing on a fragment of *Carpophyllum Maschalocarpus, natural size;* 2, part of branch, with bipartite leaves and stichidia, *highly magnified.*

5. Polyzonia *Harveyana,* Dcne. *in Raoul, Pl. Nov. Zel. p.* 32. *Harv. Ner. Austr. p.* 72.

Var. *β. Colensoi;* omnibus partibus gracilior.

Hab. Parasitical on various *Algæ,* very common.

We are indebted to Mr. Colenso for a very large suite of specimens, a comparison of which proves that *P. Harveyana* and *P. Colensoi,* of Ner. Austr., cannot be kept specifically distinct.

Gen. XL. POLYSIPHONIA, *Grev.*

(Grev. Fl. Edin. p. 308. Harv. Man. ed. 1, 84. J. Ag. Alg. Medit. p. 119. Harv. Ner. Austr. p. 37. Kütz. Sp. Alg. p. 802, etc.)

Subgenus 1. OLIGOSIPHONIA, *J. Ag.*

1. Polysiphonia *abscissa,* Hook. fil. et Harv.; dense cæspitosa vel implicata, capillaris, purpurascens vel coccinea, fronde alternatim decomposita tenaci flaccida, ramis minoribus basi longe nudis apice alterne ramulosis, ramulis patentibus fastigiatis (quasi abscissis), apicibus nudis vel fibrilliferis, articulis ramorum diametro multiplo ramulorum subduplo triplove longioribus bistriatis, siphonibus quatuor, ceramidiis globoso-ovatis pedicellatis sæpe secundis, tetrasporis parvis in ramulos distortos nidulantibus.—P. abscissa *et* P. microcarpa, *Fl. Ant. v.* 2. *p.* 479, 480. *t.* 182. *f.* 3. *Harv. Ner. Austr. pp.* 42, 43.

Hab. Akaroa, *Raoul, Lyall.* Blind Bay, Cook's Straits, and Paterson's Harbour, Southern Island, *Lyall.* (Native of Cape Horn.)

Fronds 3–6 inches high, capillary, densely tufted, of a more or less brilliant purple-red or blood-red, alternately much branched. Principal branches set with shorter ones, which are naked at the base, and multifid at the top.

On re-examining *P. microcarpa* and *P. abscissa,* of the 'Flora Antarctica,' we fear they are not sufficiently distinct. Some of our present specimens are referable to one form, and some to the other. In general habit this species much resembles *P. formosa* of the northern hemisphere, but differs in the shape of the ceramidia, etc.

2. Polysiphonia *strictissima,* Hook. fil. et Harv.; dense cæspitosa, atro-rubescens, flaccida, fronde elongata basi setacea sursum sensim attenuata capillari dichotome ramosissima, axillis inferioribus patentibus

superioribus angustissimis, ramis minoribusque erectis fere appressis, apicibus inæquilongis (nec fastigiatis), articulis inferioribus brevibus vel diametro subduplo longioribus, mediis diametro 6–8-plo, superioribus 5-plo longioribus, ultimis sesqui- triplove longioribus.—*Lond. J. Bot. v.* 4. *p.* 538. *Harv. Ner. Austr. p.* 42.

Hab. New Zealand, *Raoul*. Port Underwood, *Lyall*.

Dr. Lyall's specimens enable us to amend the specific character originally drawn up from badly-preserved specimens. The lower part of the frond is as thick as a hog's bristle, and cartilaginous; upwards it is much attenuated, flaccid, very soft, and of a brighter colour. The lower forks are patent, the upper extremely narrow. It is allied to our *P. variabilis*, but the articulations are greatly longer than in any state of that species we have seen.

3. Polysiphonia *variabilis*, Harv.; fusco-rubescens, gregaria, flaccida, fronde ultra-setacea articulata basi irregulariter dichotoma, ramis majoribus furcatis vel alterne vel secunde decompositis patentibus, minoribus alterne divisis ramosissimis, ramulis erectis apice multifidis, axillis inferioribus latis, superioribus angustissimis, articulis omnibus brevibus, inferioribus diametro brevioribus, mediis subduplo longioribus, superioribus æqualibus v. sesquilongioribus, siphonibus quatuor latis sæpe spiraliter tortis, ceramidiis lato-ovatis subsessilibus.

Var. *β. longiarticulata;* articulis longioribus, mediis diametro triplo, superioribus duplo longioribus.

Hab. On shells, etc., in deep water, Blind Bay, Port Nicholson, and Otago, *Lyall*. Tauranga, *Davies*. Var. *β*. Akaroa, and Bluff Harbour, Foveaux Straits, *Lyall*.

Fronds 2–4 inches high, as thick as a hog's bristle, flaccid, closely adhering to paper, irregularly dichotomous below, alternately or secundly branched above; very variable in the amount of ramification. *Branches* sometimes nearly naked, with but a few multifid ramuli; sometimes virgate, set with regularly alternate, multifid branchlets; sometimes inordinately divided and decompound. *Colour* a brownish-red. *Articulations* sometimes uniformly short; in other specimens the medial ones are three to four times as long as their diameter.

A common and very variable species, much resembling some forms of the northern *P. elongella*. The basal articulations only have secondary cells.

4. Polysiphonia *nana*, Harv.; fronde vix unciali crassa (setaceo-capillari) flabelliformi irregulariter dichotome ramosa, ramis patentibus, ramulis alternis subulatis acutis subfastigiatis, articulis omnibus diametro brevioribus, siphonibus quatuor amplis, ceramidiis numerosis ovatis subsessilibus.

Hab. On corallines, Auckland, New Zealand, *Lyall*.

Possibly only a dwarf state of the preceding. Our specimens, however, though crowded with fruit, are only half an inch in height.

5. Polysiphonia *brachygona*, Harv.; purpurea, rigidiuscula, fronde setacea alterne divisa vel furcata, ramis primariis pluries alterne decompositis sensim maxime attenuatis, minoribus subdichotome divisis et in ramulos capillares multifidos abeuntibus, articulis infimis brevissimis cellulis parvis corticatis, mediis bivenosis diametro sesqui- duplo (raro triplo) longioribus, superioribus fere diametrum æquantibus, ultimis brevissimis, siphonibus quatuor.

Hab. East side of Stewart's Island, *Lyall*.

Fronds 3–4 inches high, divided from the base into several principal branches, each of the thickness of a hog's bristle. These are alternately decompound, each successive series more and more slender. The secondary and other divisions are very irregular, either alternate, secund, or subdichotomous. *Axils* patent. *Substance* rigid, very imperfectly adhering to paper.—Allied to *P. Griffithsiana*, Harv.

6. Polysiphonia *rhododactyla*, Harv.; caule articulato basi vix subcorticato robusto elato dichotome ramoso cartilagineo apicem versus sensim gelatino-membranaceo et in ramulos flaccidos roseos desinente, ramis pluries furcatis, axillis patentibus, ramulis dichotome multifidis ultimis subsecundis vel fasciculatis

erectis axillis angustissimis, apicibus acuminatis, articulis infimis striæformibus brevissimis, mediis diametrum æquantibus, ramulorum majorum diametro brevioribus, minorum brevissimis striæformibus, siphonibus quatuor amplis.

HAB. Dredged in five fathoms, D'Urville Island, *Lyall.*

Habit of *P. elongata*, but very different. Nearest to *P. variabilis*, but much brighter in colour, with very different articulations, and very acute or acuminate ramuli. *Frond* 8 inches long, as thick as hog's-bristle, somewhat attenuate, the main stem and the branches cartilaginous; the ramuli very flaccid, and closely adhering to paper; ultimate ramuli frequently secund. *Joints* visible in all parts, those toward the base of the stem with supplementary cellules.

7. Polysiphonia *amphibia*, Harv.; fusco-rubens, cæspitosa, fronde articulata capillari rigidiuscula decomposite ramosissima sensim attenuata, ramis ramulisque alterne v. secundatim divisis vix dichotomis, minoribus sæpe basi longe nudis apice ramosis, axillis patentibus, articulis bivenosis, mediis nodosis diametro subduplo, superioribus duplo triplove, ultimis sæpius sesquilongioribus, siphonibus quatuor, tetrasporis parvis.

HAB. In a stream of brackish water, covered at high tides by the sea, Massacre Bay, *Lyall.*

Tufts dense, 2–3 inches high, intricate. *Fronds* capillary, much branched, rigid, attenuated upwards, the branches irregularly alternate, many times compounded, the lesser divisions all patent. *Ramuli* spreading at wide angles, often multifid at the tips.

Not sufficiently known. It somewhat resembles some states of *P. urceolata*, but its amphibious locality induces us to keep it, for the present at least, distinct.

8. Polysiphonia *rudis*, Hook. fil. et Harv., *Fl. Ant. v.* 1. *p.* 183. *t.* 74. *f.* 2. *Harv. Ner. Austr. p.* 44.

HAB. Port Underwood, Cook's Straits, *Lyall.* (Native of Auckland Islands.)

9. Polysiphonia *implexa*, Hook. fil. et Harv. *in Lond. J. Bot. v.* 4. *p.* 538. *Harv. Ner. Austr. p.* 44.

HAB. New Zealand, *Raoul.* Cape Kidnapper and Parimahu, *Colenso.*

10. Polysiphonia *macra*, Harv.; dense cæspitosa, parva (semiuncialis), e filis repentibus orta, caulibus erectis parum ramosis, ramis simplicibus alternis vel secundis filiformibus vix ramulosis, articulis omnibus conformibus trivenosis diametro æqualibus vel sesquilongioribus nunc diametro brevioribus.

HAB. Akaroa, *Lyall.* Tidal rocks, Hawke's Bay, *Colenso.*

Forming a dense, dark brown mat, on the surface of rocks, the base of the tuft composed of a dense plexus of creeping filaments, which throw up erect, subsimple, or slightly branched, irregularly-divided stems. Not the same as *P. implexa;* but not sufficiently known.

11. Polysiphonia *Colensoi*, Hook. fil. et. Harv.; caule (unciali-biunciali) setaceo robusto pellucide articulato tetragono quaquaversum ramoso, ramis alterne decompositis ramulisque duplicis generis spiraliter insertis e quoque fere geniculo egredientibus onusto, aliis subulatis simplicibus, aliis pinnatis demum in ramos proficientibus, articulis omnibus diametro brevioribus bicellulosis, cellulis quadratis, ceramidiis ovato-globosis pedicellatis. (TAB. CXII. *C.*)

HAB. Parasitical on *Sargassum* and *Carpophyllum*, *Colenso.*

A distinctly-marked species, with nearly the same order of branching and habit as *P. ceratoclada*, but readily distinguished by its four-tubed stem and branches. The articulations are pellucid in all parts of the frond, the cell-walls very thick, and the coloured portion of the cells, viewed laterally in the stem, nearly square. *Conceptacles* occupy the position of a pinnated ramulus on the larger branches. It becomes very dark in drying.—PLATE CXII. *C.* Fig. 1, plant, *natural size;* 2, part of branch, with simple and composite ramuli; 3, apex of a ramulus; 4, cross section of a branch; 5, a conceptacle (ceramidium) *in situ:—more or less magnified.*

12. Polysiphonia *Lyallii*, Hook. fil. et Harv. *Fl. Ant. v.* 1. *p.* 182. *t.* 74. *f.* 1. *Lond. J. Bot. v.* 4. *p.* 268. *Harv. Ner. Austr. p.* 41.—P. Mallardiæ, *Harv. Ner. Austr. (partim).*

Hab. Preservation Harbour and Foveaux Straits, *Lyall.* Hawke's Bay, and other stations, *Colenso.* (Native of Antarctic shores.)

Dr. Lyall's specimens here referred to are much larger and finer than those formerly received from Auckland Islands, and differ a little in ramification. *Stem* 8–12 inches long, simple, furnished throughout with closely-set, lateral, patent, simple branches, sometimes only a line or two asunder, sometimes half an inch or more. *Branches* densely clothed with multifid, imbricated ramuli. *Conceptacles* ovate, half the size of those of *P. Mallardiæ*, subsessile on the ramuli. Primary tubes sometimes five.

Mr. Colenso's specimens trace the species from an early stage. When about an inch high it is unbranched, densely clothed with multifid ramuli. Older specimens are more and more compound. Some of these latter we formerly confounded with *P. Mallardiæ*, but they differ from that species in the ceramidia, and in some minor characters, and so nearly agree with Dr. Lyall's plant as to convince us that they belong to the same species.

Subgenus 2. POLYSIPHONIA, *J. Ag.*

13. Polysiphonia *Brodiæi?* Grev.; caule elato corticato immerse articulato 7–8-siphonio simplici vel furcato alterne ramoso, ramis sæpius brevibus quaquaversum egredientibus ramulis decompositis creberrime multifidis subfasciculatis obsessis, ramulis erectis pellucide articulatis 3–4-striatis, articulis diametro sesquilongioribus, ceramidiis ovato-urceolatis ad ramulos sessilibus.—P. Brodiæi, *Harv. Phyc. Brit. t.* 195, *etc.*

Hab. On the beach, East Coast, and South Harbour, Southern Island; and Port Cooper, Banks' Peninsula, *Lyall.* (Native of Europe.)

Dr. Lyall's specimens are about 10 inches long, ½ a line in diameter at the base, well clothed with short branches an inch or two in length. They are copiously in fruit: more robust than our specimens from the West of Ireland, but not offering any very decided differences. The specimen from Port Cooper is nearly denuded of ramuli, but the few that remain have the proper structure, and bear tetraspores.

14. Polysiphonia *botryocarpa*, Hook. fil. et Harv., *Fl. Ant. v.* 1. *p.* 181. *t.* 70. *Harv. Ner. Austr. p.* 57; ceramidiis ovato-urceolatis ad ramulos sessilibus sæpius secundis.

Hab. Otago and Foveaux Straits, *Lyall.* (Native of Auckland Islands.)

Since this plant was described in the 'Flora Antarctica,' we have received from the Auckland Islands a specimen which, instead of the dense tufts of minute ceramidia, such as our former specimens bore, is copiously covered with ceramidia of a size proportionate to the species, and sessile along the ramuli, frequently several secund on each ramulus. These we must regard as the normal condition of the fruit; the tufted *ceramidia* formerly described and figured by us being the result of disease. We regret that such a character should be perpetuated in the specific name. Some of the specimens from Foveaux Straits are two feet or more in length.

15. Polysiphonia *cancellata*, Harv., *Lond. J. Bot. v.* 3. *p.* 440. *Ner. Austr. p.* 51. *t.* 15.

Hab. Banks' Peninsula, *Lyall.* (Native of New Holland.)

16. Polysiphonia *aterrima*, Hook. fil. et Harv., *Lond. J. Bot. v.* 4. *p.* 536. *Harv. Ner. Austr. p.* 52.

Hab. Parasitical on Fucoids, very common.

17. Polysiphonia *decipiens*, Mont., *Voy. Pôle Sud, Bot. v.* 1. *p.* 131. *Fl. Ant. v.* 1. *p.* 184. *Harv. Ner. Austr. p.* 50. P. rytiphlæoides, *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 537.

Hab. Otago and Akaroa, *Lyall.* New Zealand, *Raoul.*

18. Polysiphonia *ramulosa*, Harv.; nigrescens, fronde unciali setaceo-capillari articulata flabellatim ramosa, ramis virgatis alterne divisis ramulisque quaquaversum egredientibus densissime obessis, ramulis

brevibus spinæformibus patentibus nunc simplicibus subulatis nunc ramulos minores subulatos ferentibus, articulis ramorum ramulorumque diametro duplo brevioribus, siphonibus septem.

HAB. Parasitical on *Sargassa*, Parimahu, *Colenso*.

About 1 inch high, as thick as horsehair, divided above the base into numerous principal branches, which are alternately subdivided. These are beset with very numerous, patent, spine-like ramuli, one or two lines long, spreading to all sides, and either quite simple, or bearing other similar and smaller ones. *Apices* acute. *Articulations* about half as long as broad, or a little longer.

Smaller than *P. cancellata* or *P. decipiens*, and apparently different, though nearly allied.

19. Polysiphonia *isogona*, Harv.; dense cæspitosa, badia, siccitate fragilis, frondibus setaceo-capillaribus e basi decomposite ramosissimis, ramis pluries alterne vel subdichotome divisis, ramis minoribus basi longe nudis apice multifidis, ramulis erectis, axillis omnibus angustis, apicibus parce fibrillosis, articulis omnibus diametro subsesqui- vel duplo longioribus, geniculis pellucidis, siphonibus novem.

HAB. Blind Bay, Cook's Straits, *Lyall*. Cape Kidnapper and Hawke's Bay, *Colenso*.

Densely tufted. The habit is very similar to that of *P. anisogona*, but the filaments are more slender, with fewer tubes, and uniformly short articulations. It adheres to paper in drying, and is rather fragile when re-moistened. Mr. Colenso's specimens are smaller and very badly preserved, but have the microscopic characters of the species.

20. Polysiphonia *comoides*, Harv.; dense cæspitosa, badia, frondibus capillaribus e basi decomposite ramosissimis, ramis pluries alterne vel subdichotome divisis, minoribus basi nudis apicem versus alterne compositis, ramulis basi angustatis erectis, articulis mediis diametro 4–5-plo, superioribus 2–3-plo, ramulorum subsesquilongioribus, geniculis pellucidis, siphonibus novem decemve.

HAB. Akaroa and Port Cooper, Banks' Peninsula, *Lyall*.

Very similar in external habit to *P. isogona*, from which it is chiefly to be known by the longer articulations, should that character prove a constant one.

21. Polysiphonia *corymbifera*, Ag.; fusco-rubescens, dense cæspitosa, fronde capillari-setacea articulata multistriata dichotoma vel vage ramosa, axillis primariis distantibus ramisque nudiusculis, ramis minoribus lateralibus corymboso-fastigiatis pluries dichotomis, articulis ramorum diametro triplo quadruplove longioribus, ramulorum sesquilongioribus, ultimis diametrum vix æquantibus, siphonibus undecim v. duodecim.—*Ag. Sp. Alg. v.* 2. *p.* 90. *Harv. Ner. Austr. p.* 54.

HAB. Maketu, *Chapman*. (Native of Cape of Good Hope.)

Rather more slender than the Cape of Good Hope specimens, and usually with only eleven radiant cells in the axis. Habit very similar.

22. Polysiphonia *nigrescens*, Grev. *Harv. Ner. Austr. p.* 54. *Phyc. Brit. t.* 277. *E. Bot. t.* 1717, 1743.

HAB. New Zealand, *Raoul*. (Native of Northern Atlantic and Pacific.)

23. Polysiphonia *pennata*, Ag.; siccitate nigrescens, caule setaceo compresso simpliciusculo apice alterne ramoso cum ramis distiche pinnato, pinnis simplicissimis lineari-subulatis acutis erecto-patentibus pluristriatis, articulis omnibus diametrum subæquantibus, siphonibus 8–10.—*Ag. Sp. Alg. v.* 2. *p.* 102. *J. Ag. Alg. Medit. p.* 141.

HAB. Auckland, *Lyall*. Cape Kidnapper, *Colenso*. (Native of South of Europe.)

Frond 1–2 inches high, sparingly branched beyond the middle; the branches erecto-patent, simple, or alternately decompound in the upper part. All the branches at the stem pinnated with distichous, subulate, erecto-

patent ramuli. *Colour* when growing a deep red: blackish when dried.—Very similar to the Mediterranean specimens.

24. Polysiphonia *ceratoclada*, Mont., *Voy. Pôle Sud, Bot. v.* 1. *p.* 130. *t.* 5. *f.* 2. *Fl. Ant. v.* 1. *p.* 183. *t.* 76. *f.* 2. *Harv. Ner. Austr. p.* 48.

HAB. Banks' Peninsula and Lyall's Bay, Cook's Straits, *Lyall.* Parasitic on *Carpophyllum*, East Coast, *Colenso.* (Native of Auckland Islands.)

25. Polysiphonia *Sulivanæ*, Hook. fil. et Harv.; caule (e filo repente orto) erecto flabellatim ramosissimo, ramis alterne decompositis et ramulis duplicis generis e quoque fere geniculo ortis onusto, aliis lineari-subulatis acutis patentibus simplicissimis invicem sæpissime ternis, aliis alterne pinnatis demum in ramos proficientibus, articulis ramorum diametro duplo triplove, ramulorum sesquilongioribus multistriatis.—*Fl. Ant. v.* 2. *p.* 479. *t.* 182. *f.* 4. *Harv. Ner. Austr. p.* 48.

HAB. South Harbour, Southern Island, *Lyall.* (Native of Falklands.)

More robust and of larger size than our Falkland Island specimens, but the same in essential character. It is a slenderer plant than *P. ceratoclada*, with longer joints and more distant ramuli. The order of ramification is very regular: viz., ramuli issue alternately from every node; first, three subulate ramuli from successive nodes; then a pinnated one; again three subulate, and so on. The subulate ramuli never alter, but the pinnated grow out into branches. If one of the pinnate ones be attentively examined, after every third pinnule may be seen a node, either naked or hairy, a minute ramulus different from the pinnules; this ramulus is the bud of a future branch. The branching in *P. ceratoclada* is similar, but less easily seen, owing to the more densely-set ramuli.

26. Polysiphonia *dendritica*, Ag. *Harv. Ner. Austr. p.* 47.

HAB. Parasitical on *Pterocladia lucida* and other *Algæ*, common. (Native of New Holland and South America.?)

27. Polysiphonia *cladostephus*, Mont. *Pôle Sud, Bot. v.* 1. *p.* 132. *t.* 13. *f.* 4 *a.* *Harv. Ner. Austr. p.* 45. P. byssoclados, *Hook. fil. et Harv. in Lond. J. Bot. v.* 3. *p.* 436.

HAB. Parasitical on *Sargassa*, etc., Akaroa, *Lyall, Raoul.* (Native of New Holland and Tasmania.)

Gen. XLI. DASYA, *Ag.*

(Ag. Sp. Alg. ii. 116. Harv. Ner. Austr. p. 57. *Dasya, Lophothalia, Eupogonium, Trichothamnion, Eupogodon*, Kütz. Sp. Alg. pp. 795–802.)

1. Dasya *collabens*, Hook. fil. et Harv.; caule elato (8–12-unciali) tereti inarticulato flaccido glabro indiviso decomposite pinnato, pinnis (v. ramis primariis) bi-tripinnatis circumscriptione ovato-lanceolatis, pinnulis distichis iterum subdivisis et ramellis articulatis monosiphoniis dichotomis laxe vestitis, ramellis patentibus basi crassiusculis sensim attenuatis acutissimis bis-terve furcatis, articulis diametro 2–3-plo longioribus ad genicula contractis, stichidiis . . . ?—*Harv. Ner. Austr. p.* 61. *t.* 21 (*status junior*).

HAB. Akaroa, *Raoul, Lyall.* Bluff Harbour, Foveaux Straits, Chalky Bay, Middle Island, and Port Adventure, Southern Island, *Lyall.*

The figure in 'Nereis Australis,' taken from a young plant, gives a very erroneous impression of this beautiful species, which grows 8–12 inches long, and becomes three or four times pinnated, with the habit of *D. coccinea.* It is extremely soft and flaccid, and adheres very closely to paper. *Colour* a beautiful rosy-red or crimson.—Dr. Lyall's specimens are not in fruit.

2. Dasya *squarrosa*, Harv.; caule setaceo pellucide articulato vel basi subcorticato in parte inferiore sæpius ramellis pusillis exasperato apice glabro crebre pinnato v. bi-tri-pinnato, ramis distichis subtrisiphoniis,

articulis diametro æqualibus vel parum longioribus, ramulis alternis patentibus brevissimis in ramellos bis terve furcatos obtusissimos solutis, articulis ramellorum diametro sesquilongioribus, stichidiis . . . ?

HAB. On the large *Algæ*, Port William, Southern Island, *Lyall.*

Fronds gregarious, 1–2 inches high, distichous, several times pinnate. *Stems* articulate, except near the base in large specimens, rough in the lower part, with minute, horizontally patent, short, hair-like ramelli, smooth above, marked with three tubes on the lateral view, pinnate or bi-tripinnate. *Branches* springing alternately from every second or third node, very patent, pinnated with short, divaricating ramuli, which are trisiphonous at the base, but gradually pass off upwards into monosiphonous, simple or forked, exactly cylindrical, very obtuse, patent ramelli, not in the least attenuated to the point. *Articulations* of the branches about as long as broad; of the ramelli rather longer. *Colour* a fine crimson-lake. *Fruit* unknown. *Siphons* in the stem seven or eight.

3. Dasya *tessellata*, Harv.; caule unciali tereti polysiphonio pellucide tessellato vel cellulis transversim ordinatis 4–5 oblongis notato distiche pinnato vel bi-tripinnato glabro, ramis consimilibus, ramulis alternis brevissimis patentibus pectinato-dichotomis squarrosis basi tri-tetrasiphoniis in ramellos monosiphonios simplices subulatos divaricatos abeuntibus, stichidiis oblongis acutis ad latera ramulorum sessilibus.

HAB. Blind Bay and Massacre Bay, Cook's Straits, *Lyall.*

Densely tufted. *Stems* 1–2 inches high, setaceous, pellucidly cellular, or tessellated with large, transversely seriated, square or oblong cells, of which four or five are seen in the breadth of the stem, pinnate or bipinnate; the branches very patent, similarly cellular as the stem. The penultimate branches are pinnated with alternate, distichous, very patent, short ramuli, which are either regularly dichotomous, or, by suppression, pectinato-secund, three-tubed in the lower part, but passing off in the ultimate divisions into single-tubed, subulate, but not very acute, and sometimes quite obtuse, divaricating ramelli. Some of these ramelli are in fertile specimens changed into sessile stichidia. A cross section of the stem shows about twelve cells surrounding the central tube. *Colour* a fine crimson-lake.

TRIBE II. *LAURENCIACEÆ.*

Gen. XLII. ASPARAGOPSIS, *Mont.*

(Mont. Fl. Canar. Pl. Cell. Addenda, p. xv. Harv. Ner. Austr. p. 88. J. Ag. Sp. Alg. ii. 774. Kütz. Sp. Alg. p. 802. *Lictoria*, J. Ag. Linnæa xv. 22.)

1. Asparagopsis *Delilei*, Mont. *Harv. Ner. Austr. p.* 88. *t.* 35. *J. Ag. Sp. Alg. v.* 2. *p.* 776. *Kütz. Sp. Alg. p.* 802. Fucus taxiformis, *Del. Egypt. p.* 151. *t.* 57.

HAB. Dredged in five fathoms, at D'Urville Island, Cook's Straits, *Lyall.* (Native of New Holland, Tasmania, the Mediterranean Sea, and Canary Islands.)

Gen. XLIII. DELISIA, *Lamour.*

(Lamour. Dict. Cl. Hist. Nat. v. 389. Harv. Ner. Austr. p. 88. J. Ag. Sp. Alg. ii. 779. Kütz. Sp. Alg. p. 770. *Calocladia* et *Bowiesia*, Grev.)

1. Delisia *elegans*, Lamour. *Harv. Ner. Austr. p.* 89. *t.* 34. *J. Ag. Sp. Alg. v.* 2. *p.* 781. *Kütz. Sp. Alg. p.* 770. Bonnemaisonia elegans, *Ag. Sp. Alg. v.* 1. *p.* 198. *Harv. Lond. J. Bot. v.* 3. *p.* 412.

HAB. Dredged in fifteen fathoms, at Preservation Harbour, West Coast, Middle Island, and at Akaroa, Banks' Peninsula, *Lyall.* (Native of New Holland and Tasmania.)

Gen. XLIV. LAURENCIA, *Lamour.—J. Ag. ref.*

(Lamour. Ess. p. 42. Grev. Syn. p. lii. Harv. Ner. Austr. p. 81. excl. sp. J. Ag. Sp. Alg. ii. 740. Kütz. Sp. Alg. p. 852. excl. sp.)

1. Laurencia *elata*, Harv., *Ner. Austr. p.* 81. *t.* 33. *Kütz. Sp. Alg. p.* 856. *J. Ag. Sp. Alg. v.* 2. *p.* 766.

Hab. East Coast, *Colenso.* (Native of New Holland.)

2. Laurencia *virgata,* J. Ag., *Sp. Alg. v.* 2. *p.* 752.

Hab. Cape Kidnapper and Parimahu, *Colenso.* Houraki Gulf and Banks' Peninsula, *Lyall.* (Native of South Africa and California.)

Mr. Colenso's specimens closely resemble those from the Cape of Good Hope, on which Agardh founds his species. Dr. Lyall's, from Houraki Gulf, are also decidedly the same; but those from Banks' Peninsula vary in some degree from the type.

3. Laurencia *Forsteri,* Grev. *Harv. Ner. Austr. p.* 85. *J. Ag. Sp. Alg. v.* 2. *p.* 744. *Kütz. Sp. Alg. p.* 854. Fucus Forsteri, *Turn. Hist. t.* 77.

Hab. New Zealand, *Forster.* (New Holland.)

A common species in Australia and Tasmania, but which we have not received from New Zealand.

4. Laurencia *gracilis,* Hook. fil. et Harv., *Lond. J. Bot. v.* 7. *p.* 444. *Harv. Ner. Austr. p.* 84. *J. Ag. Sp. Alg. v.* 2. *p.* 746.

Hab. East Coast, *Colenso.*

5. Laurencia *distichophylla?* J. Ag.; fronde rosea vel purpurascente compressa distiche decomposito-pinnata, pinnis in rachide stricta sursum dilatatis plano-compressis bi-tripinnulatis sæpius oppositis distichis patentibus, pinnulis cylindraceis obtusis simplicibus pinnellatisve, ceramidiis ad ramulos pinnularum compositarum sessilibus ovato-urceolatis acuminatis, tetrasporis infra apices pinnellarum fasciatis.—*J. Ag. Sp. Alg. v.* 2. *p.* 762?

Hab. Waitemata Harbour, *Lyall.* Hawke's Bay and Parimahu, *Colenso.* Bay of Islands, *J. D. H., Davies.*

Fronds 2–3 inches high, densely tufted, decompound, pinnate, sometimes barely bipinnate, sometimes four to five times compounded. Outline ovate. In some of the very compound fronds the ultimate ramuli are now and then not perfectly distichous, but this is rare. *Colour* a rosy purple, brighter, and almost crimson in some of our specimens.

We have not seen specimens of Agardh's plant, but judge from his description that it cannot be greatly different from ours.

6. Laurencia *botrychioides,* Harv.; fronde nana purpurascente vel fuscescente compresso-plana disticha decomposite pinnatifida, pinnis pinnulisque in rachide stricta sursum dilatato subexcurrente sæpissime oppositis patentibus, inferioribus majoribus, pinnulis brevissimis cuneatis vel clavatis apice crenatis demum multifido-congestis, pinnellis clavæformibus tetrasporas infra apices foventibus, ceramidiis . . . ?—L. botryoides, *Harv. Ner. Austr. p.* 82 *(partim, nec Ag.).*

Hab. Bay of Islands, *J. D. H.* Parimahu, *Colenso.*

Fronds tufted, rising from matted surculi, erect, 1–3 inches high, the larger specimens three to four times pinnatifid. *Rachides* flat, especially above, ½–1 line broad, straight, closely pinnatifid; the laciniæ opposite and patent. Ultimate pinnules very short, at first crenate or tuberculate at the end, afterwards multifid, their divisions all turbinate. *Colour* dull brownish-purple.

Nearly allied to *L. concinna* of 'Nereis Australis' (*L. complanata,* Suhr.), but scarcely the same. It also resembles *L. pinnatifida,* var. *Osmunda,* and our *L. distichophylla,* but is distinguished by the colour and shape of the ramuli.

7. Laurencia *papillosa,* Grev. *Harv. Ner. Austr. p.* 84. *J. Ag. Sp. Alg. v.* 2. *p.* 756. *Kütz. Sp. Alg. p.* 855. Fucus thyrsoides, *Turn. Hist. t.* 19.

Hab. New Zealand, *Banks.* (Native of South of Europe, Gulf of Mexico, Indian Ocean, Mauritius, Sandwich Islands, etc.)

Gen. XLV. CLADHYMENIA, *Harv.*

(Harv. Lond. J. Bot. iv. 539. Ner. Austr. p. 87. excl. sp. J. Ag. Sp. Alg. ii. 771. Kütz. Sp. Alg. p. 879.)

1. Cladhymenia *Lyallii*, Harv., *Lond. J. Bot. v. 4. p.* 540. *Ner. Austr. p.* 87. *t.* 33. *J. Ag. Sp. Alg. v.* 2. *p.* 771. *Kütz. Sp. Alg. p.* 879.

Hab. Bay of Islands, *Lyall.*

2. Cladhymenia *oblongifolia*, Harv.; radice fibroso-ramosa, fronde stipitata latiuscula gelatinoso-membranacea sub-bipinnatifida, laciniis erecto-patentibus oblongo-linearibus basi attenuatis subpetiolatis apice obtusissimis margine fimbriatis, ceramidiis ovatis ad cilia marginalia ramosa filiformia sessilibus, tetrasporis in ciliis marginalibus applanatis nidulantibus.—*Harv. Lond. J. Bot. v.* 4. *p.* 540. *Ner. Austr. p.* 87. *J. Ag. Sp. Alg. v.* 2. *p.* 771. *Kütz. Sp. Alg. p.* 879. (Tab. CXIII.)

Hab. Paroah Bay and Port Cooper, Banks' Peninsula, *Lyall.* East Coast, *Colenso.*

Frond a foot or more in length, nearly an inch in breadth, pinnately or bipinnately parted; *laciniæ* erecto-patent, 6–8 inches long, ½ an inch wide, tapering to the base, very obtuse, simple, or bearing, especially in the upper half, a second series of similar laciniæ; the margin of all more or less fringed with filiform or compressed, simple or branched processes. *Conceptacles* ovate, on the sides of the marginal ciliary processes. *Tetraspores* in shorter, simpler, and flattened processes. *Colour* "red," when dry brownish. *Substance* gelatinoso-membranaceous, very closely adhering to paper in drying; soon decomposing in fresh water, and giving out a large quantity of gelatine, which stains the paper on which the specimen is displayed.

Dr. Lyall's newly-received specimens of this plant are of large size, and with perfect fructification of both kinds. In external habit, the larger ones are very similar to *Callophyllis Hombroniana*, for which, without a careful examination, some of them may be overlooked.—Plate CXIII. Fig. 1, plant, *natural size;* 2, marginal processes, bearing conceptacles; 3, vertical section of a conceptacle; 4, spores from the same; 5, marginal processes, bearing tetraspores; 6, a tetraspore:—*all more or less magnified.*

Gen. XLVI. PTILONIA, *Harv.—J. Ag.*

(Harv. Ner. Austr. p. 124. J. Ag. Sp. Alg. ii. 773.)

1. Ptilonia *Magellanica*, Harv. *J. Ag. Sp. Alg. v.* 2. *p.* 774. Thamnophora Magellanica, *Mont. Pôle Sud, p.* 162. *t.* 8. *f.* 2. Plocamium Magellanicum, *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 474.

Hab. East Coast, lat. 43°, *Lyall.* (Native of Cape Horn and Kerguelen's Land.)

We have only seen a single specimen from the above locality. This plant abounds at Cape Horn, the Falklands, and Kerguelen's Land.

Gen. XLVII. CHAMPIA, *Ag.—Harv. ref.*

(Harv. Ner. Bor. Amer. pt. 2. p. 75. *Champia* et *Lomentariæ* sp., Auct. *Chylocladiæ* sp., Grev. Ner. Austr. etc.)

1. Champia *Novæ-Zelandiæ*, Harv.; fronde stipitata compressa apice subattenuata opposite vel verticillatim composita, ramis simplicibus vel iterum ramosis, ramulis sæpius oppositis, articulis diametro duplo brevioribus, apicibus obtusis.

Var. β; ramis ramulisque apice attenuatis, ceramidiis ovato-conicis sessilibus.—Chylocladia? Novæ-Zelandiæ, *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 541. *Ner. Austr. p.* 80. Lomentaria Novæ-Zelandiæ, *Kütz. Sp. Alg. p.* 863.

Hab. Bay of Islands and Foveaux Straits, *Lyall.* Tauranga, *Davies.* Maketu, *Chapman.* Var. β. Port William, Southern Island, *Lyall.*

Broader than *C. Tasmanica*, to which it is nearly allied.

2. Champia *affinis*, Harv. Chylocladia affinis, *Hook. fil. et Harv. in Lond. J. Bot. v.* 6. *p.* 402. *Harv. Ner. Austr. p.* 79. *t.* 29. Lomentaria affinis, *Kütz. Sp. Alg. p.* 863. *J. Ag. Sp. Alg. v.* 2. *p.* 730.

HAB. Port William, Southern Island, *Lyall.* (Native of New Holland.)

The specimens are not in fruit, and are so far doubtful.

3. Champia *parvula*, Harv., *Ner. Bor. Amer. pt.* 2. *p.* 76. Chylocladia parvula, *Grev., Harv. Phyc. Brit. t.* 210. *Ner. Austr. p.* 80. Lomentaria parvula, *Gaill., Kütz. Sp. Alg. p.* 864. *J. Ag. Sp. Alg. v.* 2. *p.* 729.

HAB. Akaroa, *D'Urville, Raoul.* (Native of Northern Atlantic and Mediterranean.)

TRIBE III. *WRANGELIACEÆ.*

Gen. XLVIII. WRANGELIA, *Ag.*

(Ag. Sp. Alg. ii. 136. J. Ag. in Linn. xv. 37. J. Ag. Sp. Alg. ii. 703. Harv. Phyc. Brit. t. 27. Kütz. Sp. Alg. p. 664.)

1. Wrangelia *Lyallii*, Harv.; fronde setacea flaccida fere e basi pellucide articulata ecorticata in parte inferiore venulosa pinnatim vel bipinnatim ramosa, ramis elongatis simplicibus ad nodos opposite vel verticillatim ramellosis, ramellis pinnatis, pinnis oppositis patentibus parum attenuatis obtusis subacutisve, articulis ramorum diametro multiplo, ramellorum 6–8-plo longioribus, tetrasporis ad pinnas ultimas sessilibus solitariis vel fasciculatis triangule divisis, cystocarpiis minutis terminalibus fere nudis (vix involucratis).

HAB. Ruapuke and Preservation Harbour, *Lyall.*

Frond 4–5 inches long, thicker than hog's-bristle, once or twice pinnated; the branches long, virgate, and simple. *Stem* veiny near the base, pellucidly articulate above, and all the branches pellucidly articulate, with narrow endochrome and thick cell-walls. All the nodes are furnished with opposite or whorled, patent, pinnated ramelli; the pinnæ mostly opposite, rarely alternate. *Colour* a brilliant carmine. *Tetraspores* sessile on the inner faces of the pinnæ of the ramelli, one, two, or more at each node. *Cystocarps* minute, terminating the rachides of nearly naked ramelli. It closely adheres to paper in drying.—Allied to *W. multifida* and to *W. crassa*, but different.

2. Wrangelia *squarrulosa*, Harv.; fronde setacea rigida e basi articulata ecorticata distiche ramosa, ramis alternis oppositisve pluries compositis nunc laxe ramulosis nunc creberrime pinnatis v. bipinnatis, pinnis sæpissime oppositis, articulis omnibus diametro 2–3-plo longioribus ad genicula ramellis minutis verticillatis dichotomo-multifidis squarroso-spinescentibus obsessis, tetrasporis sessilibus in ramellos lateralibus.

Var. *α*; decomposite pinnata, pinnis pinnulisque creberrimis oppositis.

Var. *β*; vage ramosa, vix pinnata.

HAB. On the beach at Preservation Harbour, both varieties, *Lyall.*

The two varieties which we have here associated look to the naked eye very different, but not more so than parallel varieties of *D. penicillata;* and the microscopic characters of each are so similar that we fear to separate them. The squarrose ramelli, which densely clothe the nodes, are at first simple, become gradually branched, and at last are excessively divided; they are about a quarter of a line long, whorled, and crowded together, giving a beaded character to the nodes. *Substance* rigid, not strongly adhering to paper.

Except in substance there is considerable resemblance in the general aspect to *W. penicillata.* Till the cystocarps shall be discovered, the genus must remain in some degree doubtful. Possibly *Callithamnion spinescens*, Kütz., may be an allied plant.

Tribe IV. *CORALLINACEÆ.*

Gen. XLIX. AMPHIROA, *Lamour.*

(Lamour. Cor. Flex. p. 294. Dcne. Class. p. 123. Harv. Ner. Austr. p. 95. J. Ag. Sp. Alg. ii. 529. *Cheilosporum* et *Arthrocardia*, Aresch.)

1. Amphiroa *corymbosa*, Dcne., *Class. p.* 112. *Harv. Ner. Austr. p.* 99. *t.* 38. *J. Ag. Sp. Alg. v.* 2. *p.* 550.

Hab. Parimahu, and Cape Turnagain, *Colenso.* Bay of Islands, *Swainson, Lyall.* (Native of Cape of Good Hope and New Holland.)

2. Amphiroa *elegans*, Hook. fil. et Harv., *Ner. Austr. p.* 101. *t.* 38. *J. Ag. Sp. Alg. v.* 2. *p.* 546.

Hab. Cape Kidnapper, *Colenso.*

Gen. L. CORALLINA, *Linn.*

(Lamour. Cor. Flex. p. 275. Dcne. Class. p. 119. Harv. Ner. Austr. p. 103. J. Ag. Sp. Alg. ii. 560.)

1. Corallina *officinalis*, Linn. *Harv. Ner. Austr.* 104. *Phyc. Brit. t.* 222. *J. Ag. Sp. Alg. v.* 2. *p.* 562.

Hab. Auckland, *Lyall.* Ahuriri, Hawke's Bay, *Colenso.* (Native of Northern and Southern Oceans.)

2. Corallina *armata*, Hook. fil. et Harv., *Ner. Austr. p.* 103. *t.* 40. *J. Ag. Sp. Alg. v.* 2. *p.* 566.

Hab. New Zealand, several localities, *Colenso.*

Gen. LI. JANIA, *Lamour.*

(Lamour. Cor. Flex. p. 266. Dcne. Class. p. 123. Harv. Ner. Austr. p. 104. J. Ag. Sp. Alg. ii. 553, et *Corallinæ* sp., J. Ag. *l. c.*

1. Jania *Cuvieri*, Dcne. *Harv. Ner. Austr. p.* 105. *J. Ag. Sp. Alg. v.* 2. *p.* 572.

Hab. Banks' Peninsula, *Lyall.* Several stations, *Colenso, Swainson.* (Native of New Holland and South Africa.)

2. Jania *pistillaris*, Mont., *Pôle Sud, Bot. p.* 147. *Harv. Ner. Austr. p.* 105. *J. Ag. Sp. Alg. v.* 2. *p.* 574.

Hab. Bay of Islands, *Hombron.*

Unknown to us.

3. Jania *gracilis*, Mont., *Pôle Sud, Bot. p.* 147. *Harv. Ner. Austr. p.* 105. *J. Ag. Sp. Alg. v.* 2. *p.* 559.

Hab. Akaroa, *Hombron.*

4. Jania *micrarthrodia*, Lamour., *Pol. Flex. p.* 271. *t.* 9. *f.* 5 *a. B. Harv. Ner. Austr. p.* 107. *J. Ag. Sp. Alg. v.* 2. *p.* 555. J. tenuissima, *Sond. Pl. Preiss. v.* 2. *p.* 186. *Harv. Ner. Austr. t.* 40. J. antennina, *Kütz. Phyc. Gen. p.* 389. *Sond. l. c. p.* 186. *Harv. l. c. p.* 107.

Hab. Port Cooper, *Lyall.* Cape Kidnapper, Parimahu, etc., *Colenso.* (Native of New Holland.)

5. Jania *Novæ-Zelandiæ;* fronde setacea (1–2-pollicari) dichotoma, axillis acutis, articulis cylindraceis diametro subsextuplo longioribus, ceramidiis urnæformibus axillaribus ramulis binis bi-triarticulatis coronatis.

Var. *β. longiarticulata;* articulis diametro 12-plo longioribus.

Hab. Banks' Peninsula, *Lyall.* East Coast, *Colenso.*

Larger and coarser than *J. rubens*, with longer joints. Near *J. Natalensis*, but not the same.

Gen. LII. MELOBESIA, *Lamour.*

(Lamour. Cor. Flex. p. 313. Dcne. Class. *l. c.* Harv. Ner. Austr. p. 109. J. Ag. Sp. Alg. ii. p. 510. *Lithothamnion,* Phil.—Aresch.)

1. Melobesia *calcarea,* Ell. et Soll., *Harv. Phyc. Brit. t.* 291. *Harv. Ner. Austr. p.* 110. *J. Ag. Sp. Alg. v.* 2. *p.* 523.

Hab. New Zealand, *J. D. H.* (Native of Northern Atlantic.)

2. Melobesia *Patena,* Hook. fil. et Harv., *Ner. Austr. p.* 111. *t.* 40. *J. Ag. Sp. Alg. v.* 2. *p.* 514.

Hab. Parasitical on *Ballia, Colenso.*

Tribe V. *SPHÆROCOCCOIDEÆ.*

Gen. LIII. DELESSERIA, *Lamour.*

(Grev. Alg. Brit. p. 71. Harv. Ner. Austr. p. 114. J. Ag. Sp. Alg. ii. 677. excl. sp.)

1. Delesseria *Hookeri,* Lyall, MS.; fronde (maxima) petiolata cartilagineo-membranacea crassa purpurea ovato-lanceolata vel elliptico-obovata indivisa vel in laciniis pluribus palmatim partita costata nervisque suboppositis dichotomis peragrata, margine eroso vel crenulato, coccidiis hemisphæricis ore obliquo in sporophyllis propriis minutis e nervis lateralibus evolutis, tetrasporis minutis in soris oblongis parvis per laminam densissime sparsis. (Tab. CXIV., CXV.)

Hab. Lyall's Bay, Cook's Straits, Foveaux Straits, and Otago, *Lyall.*

Fronds 2 feet or more in length, 4–5 inches broad, ovato-lanceolate or elliptico-obovate, in our specimens much torn, the lacerations running obliquely from the margin to the midrib. *Apices* acute or subacute. Sometimes the frond is deeply palmatifid, the midrib branching, and one branch running through each segment. *Midrib* 1–2 lines wide, pinnated at distances of half an inch, with opposite (rarely alternate), thick, rib-like, erecto-patent, dichotomous veins, which are gradually obliterated towards the margin. *Margin* minutely eroso-dentate. *Conceptacles* on little obovate processes, 1–2 lines long, rising from the dichotomous veins, hemispherical, with an oblique, prominent orifice, and thick, cellular pericarp. *Nucleus* depressed-hemispherical, on a basal placenta; spore-threads dichotomous. *Tetraspores* in minute, oblong sori, scattered through the lamina near its base. *Colour* a splendid crimson-purple. *Substance* very thick, the surface cellules small.—The noblest of the genus.—Plate CXIV., CXV. Fig. 1, plant, *natural size;* 2, small portion of the lamina, bearing sporophylla; 3, a young conceptacle; 4, an older conceptacle; 5, vertical section of a conceptacle; 6, section of the frond:—*all more or less magnified.*

2. Delesseria *nereifolia,* Harv.; fronde cartilagineo-membranacea elastica elliptico-oblonga vel lato-lineari obtusa costata et opposite pinnatim venosa demum foliolis e costa incrassata plus minus denudata erumpentibus composita, foliolis ovatis ellipticis oblongisve integerrimis costa dilatata percursis opposite venosis et venulis microscopicis reticulatim anastomosantibus creberrime peragratis, fructu . . . ?

Hab. On the beach, Preservation Harbour, West Coast, Middle Island, and east side of the Southern Island, *Lyall.*

Principal frond 6–8 inches long, 1 inch broad, linear-oblong, obtuse, with a strong cartilaginous midrib, which, after being denuded of its membrane, is changed into a stout, naked, simple stem. From the midrib of the primary frond spring, without order, numerous secondary fronds, 2–3 inches long, $\frac{1}{2}$–$\frac{3}{4}$ of an inch wide, the youngest ovate or elliptical, the rest oblong or somewhat lanceolate. *Apices* mostly very blunt. *Leaves* very entire, flat, with broad, but not prominent, midribs, closely feathered with opposite, parallel, slender veinlets, between which the membrane is everywhere reticulated with microscopic, articulated veinlets, formed of cylindrical cells. *Colour* a rosy-purple. *Substance,* when fresh, "stiff and elastic." In drying it adheres to paper.

A distinctly-characterized species, with a beautiful and remarkable cellular structure. The fruit being unknown, it may be doubtful whether it belongs to *Delesseria* or *Wormskioldia*, J. Ag.

3. Delesseria *quercifolia*, Bory, *Coq. p.* 186. *t.* 18. *f.* 1. *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 471. *Harv. Ner. Austr. p.* 114. *t.* 46. *Kütz. Sp. Alg. p.* 878. *J. Ag. Sp. Alg. v.* 2. *p.* 692.

HAB. East Coast, lat. 43° S., *Lyall.* (Native of Falkland Islands and Cape Horn.)

4. Delesseria *Davisii*, Hook. fil. et Harv., *Fl. Ant. v.* 2. *p.* 470. *t.* 175. *Harv. Ner. Austr. p.* 115. *Kütz. Sp. Alg. p.* 878. *J. Ag. Sp. Alg. v.* 2. *p.* 689.

HAB. Ruapuke, Preservation Harbour, and Chalky Bay, *Lyall.* (Native of Cape Horn.)

This is much nearer *D. dichotoma* than we had supposed, if the New Zealand specimens, here noticed, be correctly referred.

5. Delesseria *dichotoma*, Hook. fil. et Harv., *Fl. Ant. v.* 1. *p.* 185. *t.* 71. *f.* 2. *Harv. Ner. Austr. p.* 115. *J. Ag. Sp. Alg. v.* 2. *p.* 682.

HAB. Ruapuke, and Chalky Bay, *Lyall.* (Native of Auckland Islands.)

6. Delesseria *pleurospora*, Harv.; fronde stipitata flabelliformi laciniata costa dichotoma apicem versus evanescente percursa, laciniis cuneatis dichotomis attenuatis acutis v. subobtusis patentibus, margine integerrimo, soris secus costam utrinque seriatis demum confluentibus lineari-elongatis.

HAB. Preservation Harbour, *Lyall.*

We offer this species with some doubt. It agrees with *D. dichotoma* in ramification, but is a smaller and narrower plant, and is especially characterized by having the *sori* disposed in a single series at each side of the midrib. If this character prove constant, it will be sufficient to keep it distinct.

7. Delesseria *oppositifolia*, Harv.; fronde lineari-lanceolata basi et apice attenuata costata demum foliolis oppositis e costa prorumpentibus pinnatim decomposita, foliolis lineari-lanceolatis acutis costa articulata trisiphonia percursis venisque pellucidis monosiphoniis oppositis e quoque geniculo costæ exeuntibus notatis.

HAB. South Harbour, Southern Island, rare, *Lyall.*

Our specimens are $1\frac{1}{2}$ inch in height, the leaflets about $\frac{1}{2}$ a line wide. The frond is regularly bi-tripinnate, the pinnæ and pinnulæ opposite, and horizontally patent. It is composed of simple, linear-lanceolate foliola, each opposite pair springing from the midrib of the older foliolum. The costæ of the larger leaves are cylindrical, and coated with small cellules; those of the smaller leaves are articulated, each articulation formed of three oblong, hexagonal, parallel cells. *Colour* a lake-red. No fruit seen.

8. Delesseria *crassinervia*, Mont., *Pôle Sud, p.* 164. *t.* 8. *f.* 1. *Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 184. *v.* 2. *p.* 471. *Harv. Ner. Austr. p.* 115. *J. Ag. Sp. Alg. v.* 2. *p.* 694.

HAB. Sandy Beach, Patterson's Inlet, East Coast, Southern Island, and Ruapuke, *Lyall.* (Native of Antarctic shores.)

The specimens of this species, formerly described, convey but an imperfect idea of its size and ramification. Some of the magnificent ones now sent by Dr. Lyall have a *main frond* or *rachis* 2 feet long, closely pinnated throughout with branches, each 6 or 8 inches in length. These branches emit leaflets, which are hypophyllously four to five times decompound. Some of those from Ruapuke have *conceptacles* in the midribs of the smaller leaves. The costa in all is very broad.

9. Delesseria *ruscifolia*, Lamour. *Harv. Phyc. Brit. t.* 26. *Ner. Austr. p.* 115. *J. Ag. Sp. Alg. v.* 2. *p.* 695. Fucus ruscifolius, *Turn. Hist. t.* 15. *E. Bot. t.* 1395.

HAB. On the beach, Blind Bay, Cook's Straits, *Lyall.* (Native of Europe and South Africa.)

Very similar to the common European form.

10. Delesseria *Leprieurii*, Mont., *An. Sc. Nat. 2nd Ser. v.* 13. *p.* 196. *t.* 5. *f.* 1. *Harv. Ner. Austr. p.* 116. *J. Ag. Sp. Alg. v.* 2. *p.* 682. *Harv. Ner. Bor. Amer. pt.* 2. *p.* 98. *t.* 22 *C.*

HAB. Bay of Islands, *J. D. H.* (Native of Demerara, and estuaries of North American rivers, as far north as the Hudson, at West Point.)

Gen. LIV. HEMINEURA, *Harv.*

(Ner. Austr. p. 116. *Delesseriæ* sp., J. Ag. *Hypoglossi* sp., Kütz.)

1. Hemineura *cruenta*, Harv.; fronde pinnatifido-decomposita tenuissime membranacea rosea integerrima crispa, costa valida infra apicem obsoleta demum foliifera, laciniis minoribus pinnatifidis patentibus acutis costula basi apiceque evanescente notatis.

HAB. Massacre Bay, Cook's Straits, *Lyall.*

Fronds tufted, 4–5 inches long, ½–1 inch broad, bi-tri-pinnatifid, the laciniæ narrow, the ultimate ones not more than a line in breadth, delicately membranaceous, crisped and waved. A strong midrib runs through the principal rachis of the frond, but without emitting lateral branches to the lobes. These lobes have slender midribs, which commence at the base of the lobe, and disappear nearly at its apex. The young marginal lobes are faintly costulate in a similar way. *Apices* acute, and margin quite entire.

In our specimens the midrib of the primary frond emits, in the upper part, very numerous, minute, lanceolate leaflets, which are perhaps afterwards developed into new fronds; if so, old plants must be very dense and intricate. We have seen no fruit.

Gen. LV. NITOPHYLLUM, *Grev.*

(Grev. Alg. Brit. p. 77. Harv. Ner. Austr. p. 118. J. Ag. Sp. Alg. p. 651. *Aglaophyllum*, Mont., D'Orb. Voy. p. 33. Endl. 3rd Suppl. p. 52. *Aglaophyllum*, *Schizoglossum*, et *Cryptopleura*, Kütz. Sp. Alg.)

1. Nitophyllum *D'Urvillæi*, J. Ag., *Sp. Alg. v.* 2. *p.* 666. Dawsonia D'Urvillæi, *Bory, Coq. t.* 19. *f.* 1. Aglaophyllum D'Urvillæi, *Mont.! Bonite, p.* 111.

HAB. Ruapuke, Foveaux Straits, *Lyall.* (Native of Chili.)

Dr. Lyall's specimens agree very well with the specific character, and also, except in size, with a specimen received from Dr. Montagne. They are about 10 inches long, the stipes nearly 3 inches before it branches, and strongly costate. The lamina is palmato-dichotomous, the segments linear, subcuneate, the lower ones crisped at the margin, the upper slightly undulate, the terminal lobes linear-oblong, and very obtuse. The costa of the stipes divides into several branches, one of which is directed to each of the principal lobes of the frond, and is continued upwards until it is gradually explanated and lost near the apex. *Tetraspores* in minute, dot-like sori, aggregated in the upper lobes, over which they are thickly scattered.—The habit of this species is very similar to that of *Botryoglossum platycarpum.*

2. Nitophyllum *palmatum*; stipite elongato cuneato medio incrassato basi vix subcostato in laminam palmatifidam aveniam (venulis microscopicis tenuissimis nihilominus percursam) crassiusculam sensim dilatato, laciniis majoribus cuneatis dichotome palmatis, minoribus lato-linearibus obtusis margine integerrimis erectis, sinubus angustis, coccidiis sparsis, soris oblongis per lacinias superiores densissime longitudinaliter seriatis vel sparsis.

Var. β. *marginatum*; margine foliifero.

Var. γ? *membranaceum*; fronde tenuiore roseo-sanguinea.

Var. δ?? *pinnatifidum*; laciniis plus minus pinnatifidis, sinubus latioribus rotundatis.

Var. ε?? *crispatum*; præcedente simile, nisi laciniis omnibus crispatissimis.

HAB. East Coast, *Lyall, Colenso*, apparently common. Vars. β and γ, in the same locality, *Lyall.* Vars. δ and ε. Foveaux Straits and Port Cooper, *Lyall.*

Frond 6–8 inches long, or more. *Stipes* broadly cuneate, 1–2 inches long, thickened in the middle, but not ribbed. *Lamina* vertically cleft into numerous lineari-cuneate, very erect segments, with very narrow axils. Smaller laciniæ linear-oblong, obtuse, flat, and even. *Substance* thickish. *Colour* when dry a dull brownish-red. *Conceptacles* abundantly scattered through the upper segments. *Sori* oblong, often elongate, generally disposed in longitudinal, interrupted lines, closely covering the surface of the lamina for an inch or two below the summit, and continued in the lower part within the margin, sometimes scattered. Such is our var. α, the common form, which bears a strong resemblance in aspect to *Rhodymenia palmata.* Var. γ is of much thinner substance and brighter colour, and may perhaps prove to be a distinct species. Vars. δ and ε have the lobes pinnatifid and the axils obtuse, and it is not without hesitation that we refer them to this species.

3. Nitophyllum *variolosum*, Harv.; stipite cuneato basi incrassato mox in laminam aveniam dichotome vel palmatim partitam abeunte, laciniis decomposite multifidis superioribus angustioribus sæpius processibus ciliiformibus marginatis aspergatisque, axillis patentibus apicibusque obtusis, soris sparsis subhemisphærico-convexis tetrasporas paucas triangule divisas foventibus.

HAB. Port Cooper, Banks' Peninsula, *Lyall.* East Coast, *Colenso.*

Frond 2–3 inches high, slightly stipitate, irregularly multifid. Upper laciniæ very narrow, and repeatedly dichotomous. Sometimes multifid lacinulæ issue from the sides, as well as the ends, of the upper segments, and then the frond becomes very intricately divided. In such specimens especially the upper lobes are sprinkled over and margined with ciliiform, gland-like, or root-like processes. *Sori* thickened into pimple-like tubercles, very convex, containing few tetraspores.—Seemingly a distinct species; readily known when in fruit.

4. Nitophyllum *denticulatum*, Harv.; stipite cuneato costa mox evanescente aut supra productiore ramosa percurso in lamina sæpius avenia flabelliformi plus minus dichotoma abeunte, lamina nunc subindivisa vel parum lobata nunc profunde partita, margine sæpissime eroso-denticulata crispata, apicibus obtusis, coccidiis sparsis, soris ovatis oblongisve numerosissimis per totam frondem sparsis.

Var. β; fronde subsessili ovata vel suborbiculari, margine pinnatifido eroso-denticulato.

Var. γ; fronde dichotoma denticulata crispata.

Var. δ?; fronde dichotoma, margine integerrimo undato-crispato.

HAB. Blind Bay, Cook's Straits, and East Coast, *Lyall.* Maketu, *Chapman.* Tauranga, *Davies.*

This resembles *N. Bonnemaisoni* in habit, but is almost always denticulate at the margin.

5. Nitophyllum *multinerve*, Hook. fil. et Harv., *Fl. Ant. v.* 2. *p.* 473. *Harv. Ner. Austr. p.* 119. *J. Ag. Sp. Alg. p.* 666. Cryptopleura multinervis, *Kütz. Sp. Alg. p.* 870.

HAB. Massacre Bay, Cook's Straits, Chalky Bay, Middle Island, and east side of Southern Island, *Lyall.* (Native of Falkland Islands.)

6. Nitophyllum *minus*, Sond.; dense cæspitosa, pusilla, fronde sessili e basi dichotomo-pinnata, segmentis linearibus angustis divaricato-patentibus obtusis multifidis, axillis omnibus latis, soris terminalibus solitariis oblongis vel orbiculatis.—Cryptopleura minor, *Sond. in Preiss. Pl. v.* 2. *p.* 194. *Harv. Ner. Austr. p.* 119. *J. Ag. Sp. Alg. v.* 2. *p.* 655.

HAB. Parasitical on various Algæ. East Coast, *Colenso.* Tauranga, *Davies.* (Native of New Holland.)

Mr. Colenso's specimens are very similar to one communicated by M. Sonder. Mr. Davies's are twice as broad, but in other respects the same.

7. Nitophyllum *uncinatum*, J. Ag., *Sp. Alg. v.* 2. *p.* 654?

Hab. Blind Bay, Cook's Straits, *Lyall.* (Native of Europe.)

Our specimens are not in fruit, but have the habit of the European *N. uncinatum.*

8. Nitophyllum? *suborbiculare,* Harv.; fronde pusilla subsessili rotundata indivisa, margine integerrimo vel crenato-lobato, cystocarpiis sorisque per totam frondem dense conspersis.

Hab. Parasitical on *Carpophyllum Maschalocarpus.* Blind Bay, Cook's Straits, *Lyall.* Hawke's Bay, *Colenso.*

Frond with a very minute setaceous stipes, or subsessile, suddenly expanding into a roundish, delicately membranaceous, entire lamina, about 1 inch in diameter, and of a bright rosy-red colour. *Lamina* composed of a single layer of irregularly angular cells, of moderate size. *Conceptacles* scattered over the surface, prominent on both sides, depressed, spheroidal, with thick walls composed of several rows of cells in radiating lines. *Nucleus* not perfectly seen in the few cuttings made. *Tetraspores* formed in slightly thickened, depressed, wart-like sori scattered over the surface.

We are not quite certain of the genus of this plant, the nucleus requiring a careful re-examination, when more specimens shall have been obtained. Should it have the structure of the *Rhodymeniaceæ,* as we half suspect, the genus may be called *Abroteia.*

Gen. LVI. SARCODIA, *J. Ag.*

(J. Ag. Sp. Alg. ii. 622. *Rhodymeniæ* sp., Hook. et Harv.)

1. Sarcodia *Montagneana,* J. Ag., *Sp. Alg. v.* 2. *p.* 623. Rhodymenia Montagneana, *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 544. *Harv. Ner. Austr. t.* 48. Rhodophyllis Montagneana, *Kütz. Sp. Alg. p.* 787.

Hab. Bay of Islands, *J. D. H., Lyall.*

A very distinct genus, with a curious and beautiful structure of frond.

Gen. LVII. PHACELOCARPUS, *Endl. et Dies.*

(Endl. et Dies. Bot. Zeit. 1845, p. 290. J. Ag. Sp. Alg. ii. 646. *Ctenodus,* Kütz. Phyc. Gen. p. 407.)

1. Phacelocarpus *Labillardieri,* J. Ag., *Sp. Alg. v.* 2. *p.* 648. Ctenodus Labillardieri, *Kütz. Phyc. Gen. p.* 407. *t.* 58. *f.* 2. *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 549. Fucus Labillardieri, *Mert. in Turn. Hist. t.* 137.

Hab. Common, *Sinclair, Lyall, Colenso, etc.* (Native of New Holland.)

Gen. LVIII. MELANTHALIA, *Mont.*

(Mont. An. Sc. Nat. 1843. Kütz. Sp. Alg. p. 784. J. Ag. Sp. Alg. ii. 611.)

1. Melanthalia *abscissa,* Hook. fil. et Harv., *Lond. J. Bot. v.* 4. *p.* 548. *J. Ag. Sp. Alg. v.* 2. *p.* 613. Fucus abscissus, *Turn. Hist. t.* 223. Chondrococcus abscissus, *Kütz. Sp. Alg. p.* 752.

Hab. New Zealand, *Banks.*

2. Melanthalia *Jaubertiana,* Mont., *Pl. Cell. Exot. v.* 4. *p.* 36. *J. Ag. Sp. Alg. v.* 2. *p.* 613. *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 548. *Kütz. Sp. Alg. p.* 784.

Hab. Abundant in several localities, *Sinclair, J. D. H., Lyall, Colenso, etc.* (Native of Tasmania.)

We retain this species in deference to the opinions of Dr. Montagne and Professor J. Agardh, although unable to point out a character by which it can be distinguished from *M. abscissa,* of which we consider *M. Jaubertiana* to be only a more developed form.

Gen. LIX. GRACILARIA, *Grev.*

(Grev. Alg. Brit. p. 121. J. Ag. Sp. Alg. ii. 584. *Plocaria*, Endl. 3rd Suppl. p. 50. *Sphærococci* sp., Kütz.)

1. Gracilaria *confervoides*, Grev., *Alg. Brit. p.* 123. *Harv. Phyc. Brit. t.* 65. *J. Ag. Sp. Alg. v.* 2. *p.* 587. Fucus confervoides, *Turn. Hist. t.* 84. *E. Bot. t.* 1668, etc.

HAB. Otago and Ruapuke, *Lyall.* Hawke's Bay, *Colenso.* Tauranga, *Davies.* (Native of temperate and tropical oceans.)

2. Gracilaria *multipartita*, var. *polycarpa*, Grev., *Harv. Phyc. Brit. t.* 15. *J. Ag. Sp. Alg. v.* 2. *p.* 600. Sphærococcus polycarpus, *Grev. Crypt. Scot. t.* 352. Fucus granateus, *Turn. Hist. t.* 215.

HAB. Blind Bay, Cook's Straits, *Lyall.* (Native of temperate and tropical oceans. Rare in England.)

3. Gracilaria *coriacea*, Harv.; stipite brevi mox cuneato in frondem planam carnoso-coriaceam dichotomo-flabelliformem desinente, laciniis cuneatis dichotomis vel vage fissis margineque nonnunquam folioliferis, axillis rotundatis apicibusque obtusis, conceptaculis numerosissimis per frondem sparsis depresso-hemisphæricis semi-immersis umbilicatis poro magno pertusis.—Rhodymenia? coriacea, *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 545.

HAB. Lyall's Bay, Cook's Straits, and Bay of Islands, *Lyall.*

This resembles *G. multipartita* in habit, but is very much thicker, more coriaceous, and minutely wrinkled when dry. The conceptacles are deeply sunk in the frond, much depressed or umbilicate at the apex, with a small, basal placenta, from which rise innumerable spore-threads. These, in our specimens, break up into innumerable minute spores, more like those of a *Rhodymenia* than of a *Gracilaria*, but we suspect that they are immature or abortive.

Gen. LX. CALLIBLEPHARIS, *Kütz.*

(Kütz. Phyc. Gen. p. 403. Sp. Alg. p. 755. J. Ag. Sp. Alg. ii. 618. *Rhodymeniæ* sp., Grev. et Auct.)

1. Calliblepharis? *tenuifolia*, Harv.; fronde tenuissime membranacea rosea dichotomo-pinnata et e margine foliifera, laciniis basi maxime attenuatis oblongo-lanceolatis nunc subciliato-dentatis, coccidiis . . . tetrasporis (zonatim divisis) sparsis.

HAB. Chalky Bay, *Lyall.*

Frond 6–8 inches long, 1 inch broad, with the aspect of *C. ciliata*, but very much thinner in substance, and brighter in colour. *Tetraspores* scattered through all the laciniæ, zonate.—The genus of this plant cannot be certainly ascertained till the conceptacles shall have been discovered. It may possibly be a *Rhodophyllis.*

TRIBE VI. *GELIDIACEÆ.*

Gen. LXI. GELIDIUM, *Lamour.*

(J. Ag. Sp. Alg. ii. 466. *Gelidium*, Auct. excl. sp.)

1. Gelidium *corneum*, Lamour., *Harv. Phyc. Brit. t.* 53. *J. Ag. Sp. Alg. v.* 2. *p.* 469. *Kütz. Sp. Alg. p.* 764. Fucus corneus, *Huds.*, *Turn. Hist. t.* 257. *E. Bot. t.* 1970, etc.

HAB. Hawke's Bay, *Colenso.* Banks' Peninsula, *Lyall.* (Generally diffused.)

Besides an ordinary form, the var. *clavatum*, Grev. (*cæspitosum*, J. Ag.), is sent by Mr. Colenso from Cape Kidnapper, and another variety, growing on mussel-shells, from several localities, by Messrs. Colenso, Chapman, and Davies. This latter variety, which at first we felt disposed to keep distinct, may be called *subulifolium.* It is 1–2 inches high, nearly or quite terete, as thick as hog's-bristle, and closely pinnate throughout; the lowest pinnæ short and simple, the upper longer and compound. All the pinnules acute and thorn-like, mostly opposite. *Colour* dark, lurid-purple.

2. Gelidium *asperum*, Grev., *Kütz. Sp. Alg. p.* 475. *J. Ag. Sp. Alg. v.* 2. *p.* 475.

Hab. New Zealand, *Baume, fide J. Ag. l. c.* (New Holland.)

Gen. LXII. PTEROCLADIA, *J. Ag.*

(J. Ag. Sp. Alg. ii. 482. *Gelidii* sp., Auct.)

1. Pterocladia *lucida*, J. Ag., *Sp. Alg. v.* 2. *p.* 483. Gelidium lucidum, *Sond. Pl. Preiss. v.* 2. *p.* 174. *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 549. *Kütz. Sp. Alg. p.* 763. Fucus lucidus, *Br. in Turn. Hist. t.* 238.

Hab. Very abundant. (Native of New Holland.)

A most variable plant, sporting quite as much as *Gelidium corneum*. *Pterocladia* is only to be known from *Gelidium* by the structure of the conceptacle. In external habit, and in the structure of the frond, there is a close resemblance.

Gen. LXIII. HYPNEA, *Lamour.*

(J. Ag. Sp. Alg. ii. 438. Kütz. Sp. Alg. p. 758, etc.)

1. Hypnea *musciformis*, Lamour. *J. Ag. Sp. Alg. v.* 2. *p.* 442. *Kütz. Sp. Alg. p.* 758. Fucus musciformis, *Wulf. Turn. Hist. t.* 127.

Hab. New Zealand, *Banks.* (Native of tropical and sub-tropical seas.)

We have not seen any New Zealand specimens of this plant.

Gen. LXIV. CAULACANTHUS, *Kütz.*

(Kütz. Phyc. Gen. p. 395. Sp. Alg. p. 753. J. Ag. Sp. Alg. ii. 432. *Olivia*, Mont. Fl. Alg. p. 126.)

1. Caulacanthus *spinellus*, Kütz., *Sp. Alg. p.* 753. *J. Ag. Sp. Alg. p.* 434. Rhodomela? spinella, *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 534. *Harv. Ner. Austr. p.* 36.

Hab. On corallines, mussel-shells, etc. Common, *Colenso.*

We formerly misunderstood the affinities of this little plant, which is a true species of *Caulacanthus.*

Tribe VII. *CHÆTANGIEÆ.*

Gen. LXV. APOPHLŒA, *Harv.*

(Harv. in Lond. J. Bot. iv. 549. Kütz. Sp. Alg. p. 795. J. Ag. Sp. Alg. ii. 457.)

1. Apophlœa *Sinclairii*, Harv., *Lond. J. Bot. v.* 4. *p.* 550. *Kütz. Sp. Alg. p.* 795. *J. Ag. Sp. Alg. v.* 2. *p.* 548. (Tab. CXVI. *B.*)

Hab. New Zealand, *Sinclair, Wilkes, Colenso.*

Plate CXVI. *B.* Fig. 1, plant, attached to a stone; 2, cross section of a minute portion of the frond; 3, tetraspore-cavity from the same; 4, tetraspores; 5, peripheric filaments of the frond:—*more or less highly magnified.*

2. Apophlœa *Lyallii*, Hook. fil. et Harv.; fronde stipitata flabelliformi fastigiata dichotome ramosissima, ramis pluries furcatis flexuosis patentibus crassissimis, axillis rotundatis apicibusque obtusis, strato corticali madefacto persistente. (Tab. CXVI. *A.*)

Var. *β. gigartinoides;* fronde minori omnibus partibus dimidio graciliori, cæterum simillima.

Hab. On rocks, Preservation Harbour, Middle Island; and var. *β* at Otago, *Lyall.*

Fronds, in var. *α*, 5–6 inches long, with a slender stipes, which gradually increases in diameter upwards, forks about an inch above the base, and then attains from 1½–2 lines in diameter. It afterwards forks eight or nine times, the diameter remaining nearly the same, until at the final furcations it rapidly diminishes. *Axils* all rounded, and

apices obtuse. *Tetraspores* attached to the walls of cavities hollowed out of the cortical layer of the branches, over which they are abundantly scattered. The structure of the frond is similar to that of *A. Sinclairii*, but the cortical layer does not effloresce on immersion in fresh water, after having been dried.—PLATE CXVI. *A.* Fig. 1, plant, and 2, the same, var. *β*, *both of the natural size;* 3, cross section of a minute portion of the frond, with the immersed tetraspore-cavities; 4, tetraspores:—*both highly magnified.*

TRIBE VIII. *SQUAMARIEÆ.*

Gen. LXVI. PEYSSONNELIA, *Dcne.*

(Dcne. Pl. Arab. p. 168. J. Ag. Alg. Medit. p. 92; Sp. Alg. ii. 499. Kütz. Sp. Alg. p. 695. Harv. Phyc. Brit.)

1. Peyssonnelia *rugosa*, Harv.; fronde arctissime adnata expansa orbiculari intense rubro-fusca, superficie rugosissima.

HAB. On the surface of sand-covered rocks, Cape Kidnapper, *Colenso.*

Fronds 1–2 inches broad, attached by the whole of the under surface, more or less orbicular, the upper surface wrinkled all over without regularity. *Colour* a very dark reddish-brown. *Substance* membranaceo-coriaceous, thicker than in *P. Dubyi.*—We have not seen fruit, but the structure of the frond is the same as in others of this genus.

TRIBE IX. *HELMINTHOCLADIEÆ.*

Gen. LXVII. NEMALION, *Duby.*

(Duby, Bot. Gall. p. 959. J. Ag. Sp. Alg. ii. 417. Kütz. Sp. Alg. p. 712, etc.)

1. Nemalion *ramulosum*, Harv.; fronde vermiformi compressa (2–3 lineas lata) quaquaversum ramosa vel subdichotoma, ramis crebris inæquilongis patentissimis simplicibus furcatisve iterum ramulosis, apicibus obtusis.

HAB. Otea, *Lyall.*

Frond 6 inches long, 2–3 lines wide, compressed, once or twice forked, and densely set with lateral branches and ramuli, spreading irregularly to every side. *Branches* of very unequal lengths, long and short intermixed; in our specimens 1–2 inches long, horizontally spreading, obtuse, simple, or set with lateral ramuli, their ends often divaricately forked. *Axis* composed of densely interwoven, slender filaments; *periphery* of elongated, dichotomous filaments. *Fruit* unknown.—This appears a well-marked species, but probably varies much in ramification. We have seen very few specimens.

Gen. LXVIII. SCINAIA, *Bivona.*

(Bivona, in L'Iride, 1822. J. Ag. Sp. Alg. ii. 420. *Ginannia*, Mont. Canar. p. 162. Endl. 3rd Suppl. p. 40. Harv. Phyc. Brit. t. 69. Kütz. Sp. Alg. p. 715, etc.)

1. Scinaia *furcellata*, Bivona. *J. Ag. Sp. Alg. v. 2. p.* 422. Ginannia furcellata, *Mont. Harv. Phyc. Brit. t.* 69. *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 548. Ulva furcellata, *E. Bot. t.* 1881.

HAB. East Coast, *Cunningham.* (Native of temperate and subtropical seas.)

TRIBE X. *RHODYMENIACEÆ.*

Gen. LXIX. PLOCAMIUM, *Lamour.*

(Harv. Fl. Ant. p. 186. Ner. Austr. p. 121. J. Ag. Sp. Alg. ii. 392. *Plocamium*, *Thamnophora*, et *Thamnocarpus*, Kütz. Sp. Alg. p. 883.)

1. Plocamium *coccineum*, Lyngb., *Hyd. Dan. p.* 39. *t.* 9. *Harv. Phyc. Brit. t.* 44. *Hook. fil. et*

Harv. Fl. Ant. v. 1. *p.* 186, *v.* 2. *p.* 474. *J. Ag. Sp. Alg. v.* 2. *p.* 395. *Kütz. Sp. Alg. p.* 883. Fucus coccineus, *Huds. Turn. Hist. t.* 59. *E. Bot. t.* 1242.

HAB. Common all round the coast; many varieties. (Atlantic, Pacific, and Antarctic seas. Very rare on east coast of North America.)

2. Plocamium *costatum,* Hook. fil. et Harv., *Alg. Tasm. in Lond. J. Bot. v.* 6. *p.* 404. *Harv. Ner. Austr. p.* 122. *Kütz. Sp. Alg. p.* 886. *J. Ag. Sp. Alg. v.* 2. *p.* 403. Thamnophora costata, *J. Ag. in Linnæa* xv. *p.* 10. T. Cunninghamii, *Grev.*

HAB. Bay of Islands, etc., common. (New Holland and Tasmania.)

3. Plocamium *procerum,* Hook. fil. et Harv., *Lond. J. Bot. v.* 4. *p.* 542. *Ner. Austr. p.* 122. Thamnophora procera, *J. Ag. in Linn.* xv. *p.* 10.

HAB. New Zealand, *Lyall.* (New Holland.)

4. Plocamium *corallorhiza,* Hook. fil. et Harv., *Lond. J. Bot. v.* 4. *p.* 542. *Harv. Ner. Austr. p.* 121. *J. Ag. Sp. Alg. v.* 2. *p.* 402. Thamnophora corallorhiza, *Ag. Sp. p.* 225. Fucus corallorhiza *et* F. cirrhosus, *Turn. Hist. tt.* 96, 63.

HAB. Dusky Bay, *Forster.* (Native of Cape of Good Hope.)

This locality requires verification.

5. Plocamium *angustum,* Hook. fil. et Harv. *in Lond. J. Bot. v.* 6. *p.* 404. *Harv. Ner. Austr. p.* 122. *Kütz. Sp. Alg. p.* 885. *J. Ag. Sp. Alg. v.* 2. *p.* 402. Thamnophora angusta, *J. Ag. in Linn.* xv. *p.* 10.

HAB. New Zealand, common, *Colenso, etc.* (Native of New Holland.)

6. Plocamium *abnorme,* Hook. fil. et Harv., *Lond. J. Bot. v.* 4. *p.* 543. *J. Ag. Sp. Alg. v.* 2. *p.* 401. *Harv. Ner. Austr. p.* 123.

HAB. Bay of Islands, *Lyall, J. D. H.* Maketu, *Chapman.*

7. Plocamium *cruciferum,* Harv.; fronde costata angusta pectinato-pinnata, pinnis alterne geminis, inferiore laciniisque superioris lineari-subulatis parum acutis integerrimis, sporophyllis axillaribus pedicellatis tri-multilobatis cruciformibus vel palmatifidis lobis brevissimis oblongisve, tetrasporis numerosissimis.

HAB. East Coast, *Colenso.*

Scarcely to be known from *P. angustum,* except by the difference in the *sporophylla,* which here resemble compositions of Greek foliated crosses or trefoils; sometimes, by excessive division, multiradiate. The lobes are short, and the whole stichidium generally crowded with large tetraspores. Our New Zealand specimens of *P. angustum* have sporophylla similar to those found on the original Tasmanian ones, and are larger than the present plant, with shorter, more deltoid, and more acute ramuli.

8. Plocamium *dispermum,* Harv.; fronde costata angusta pectinato-pinnata decomposita subflabelliformi, pinnis alterne geminis, inferiore laciniisque superioris anguste subulatis acutis integerrimis, sporophyllis axillaribus minutissimis decomposite ramosis ramis petiolatis ovatis oblongisve tetrasporas binas foventibus, coccidiis supra-axillaribus sessilibus sparsis.

HAB. Foveaux Straits, and Lyall's Bay, Cook's Straits, *Lyall.* East Coast, *Colenso.*

Frond 6–12 inches long, ½ a line broad, stipitate, afterwards decompound, closely pectinato-pinnate, more or less flabelliform. In the shape of the ramuli it resembles *P. angustum,* but the habit is different, and the form of the sporophylla quite peculiar; each ovate, pedicellate lobe rarely containing more than two tetraspores, which are of such large size as to fill the lobule. The ramification is most like that of *P. abnorme,* but the fruit is very different.

Gen. LXX. RHODOPHYLLIS, *Kütz.*

(Kütz. Sp. Alg. p. 786. J. Ag. Sp. Alg. ii. 387. *Stictophyllum*, Kütz. Sp. Alg. 874. *Euthoræ* sp., J. Ag. l. c. p. 385.)

1. Rhodophyllis *Gunnii*, Harv.; fronde tenui-membranacea rosea decomposita pinnatifida, laciniis alternis subbipinnatifidis crebris, lacinulis crenato-dentatis, axillis rotundatis apicibusque obtusis, coccidiis sphæricis marginalibus, tetrasporis zonatim partitis prope apices laciniarum sparsis.—Cladhymenia? Gunnii, *Harv. Lond. J. Bot. v.* 4. *p.* 540. *Harv. Ner. Austr. p.* 87. *t.* 32. Callophyllis Gunnii, *Kütz. Sp. Alg. p.* 746. Euthora Gunnii, *J. Ag. Sp. Alg. v.* 2. *p.* 386.

Hab. Dredged in fifteen fathoms, at Preservation Harbour, and found on the sandy beach at Chalky Bay, West Coast, *Lyall.* (Native of Tasmania.)

Dr. Lyall's specimens, with both descriptions of fruit, are very similar to those sent by Mr. Gunn from Tasmania. The tetraspores are zonate, and not tripartite, as incorrectly shown in the plate in 'Nereis Australis.'

2. Rhodophyllis *membranacea*, Hook. fil. et Harv.; fronde tenui-membranacea rubra (siccitate fuscescenti) punctis rubris minutissimis densissime conspersa decomposite pinnatifida et sæpe prolifero-fimbriata, laciniis alternis primariis latis secundariis angustis, lacinulis profunde lobatis pinnatifidisve, ultimis lineari-oblongis subacutis basi angustatis, axillis rotundatis, coccidiis sphæricis marginalibus, tetrasporis zonatim partitis prope apices laciniarum sparsis.—Halymenia? membranacea, *Harv. in Lond. J. Bot. v.* 4. *p.* 448. Rhodymenia membranacea, *Harv. l. c. v.* 6. *p.* 405. Stictophyllum membranaceum, *Kütz. Sp. Alg. p.* 874. Euthora membranacea, *J. Ag. Sp. Alg. v.* 2. *p.* 385. (Tab. CXVII.)

Hab. Cook's Straits, *Lyall.* East Coast, *Colenso.* (Native of Tasmania.)

Nearly related to the preceding, but with narrower segments and a more ragged habit, and a very fugacious colour. Under a lens the whole frond appears closely dotted with dark red specks, which we formerly mistook for tetraspores. The true tetraspores are confined to the ultimate laciniæ, and are zonate. Our present specimens are well furnished with fruit of both kinds.—Plate CXVII. Fig. 1, plant, *natural size;* 2, vertical section of a conceptacle; 3, spore-threads from the same; 4, apex of a lacinia, with scattered tetraspores; 5, a tetraspore:—*all more or less highly magnified.*

3. Rhodophyllis? *angustifrons,* Harv.; dense cæspitosa, intense rubra, fronde angustissima lineari e basi dichotomo-decomposita, laciniis divaricatis sæpe dichotomis nunc tri-multifidis, axillis rotundatis, apicibus acutis v. obtusis, fructu . . . ?

Var. β; duplo angustior, apicibus omnibus acutissimis.

Hab. Port Nicholson and Bluff Harbour, *Lyall.*

Fronds densely tufted, 2–3 inches high, excessively branched from the base, dichotomous or irregularly partite; the laciniæ from $\frac{1}{4}$ line to a line, rarely more in breadth, preserving nearly the same width throughout, or slightly widening upwards, widely spreading, the terminal ones frequently secund. *Apices* either blunt or acute. *Substance* membranaceous, adhering to paper.—The genus to which this plant should be referred cannot be ascertained till the fruit be discovered.

4. Rhodophyllis? *lacerata*, Harv.; stipite cartilaginea filiformi brevi mox complanato et in basi frondis desinente, lamina tenuissime membranacea rosea subdichotoma, laciniis primariis latis secundariis sensim angustatis dichotomo-multifidis, ultimis elongatis attenuatis acutis fere subulatis hic illic parcissime denticulatis, fructu . . . ?

Hab. On rocks at Port William, *Lyall.* (A single specimen.)

We do not like to found species on single specimens, and yet are unwilling to omit some notice of this plant, which can hardly be referred to the preceding; and we are unable to point to any nearer relationship.

Gen. LXXI. RHODYMENIA, *Grev. ref.*

(Grev. Alg. Brit. p. 84 (ref.). J. Ag. Sp. Alg. ii. 375.)

1. Rhodymenia *sanguinea,* Harv.; stipite tereti brevi mox cuneato-applanato et in basi frondis abeunte, fronde purpureo-sanguinea palmato-dichotoma profunde laciniata, laciniis latis angustisve cuneatis apice attenuatis margine simplici vel foliifero, foliolis cuneatis, axillis rotundatis, cystocarpiis hemisphæricis numerosissimis per totam frondem tetrasporisque per lacinias minores densissime sparsis.

Hab. Foveaux Straits, *Lyall.*

Fronds rising for half an inch, with a cylindrical stipes, which then flattens into the cuneate base of the lamina, sometimes an inch, sometimes 2–3 inches to the first fork. *Frond* 12–14 inches long, as much or more in the expansion of the laciniæ, deeply divided; laciniæ from half an inch to one or two inches broad, cuneate, attenuated to the apex. Sometimes the apices are truncate, and then frequently foliiferous; the leaflets cuneate, either truncate or pointed; margin entire or foliiferous. *Conceptacles* very numerous, hemispherical, scattered over the whole frond; nucleus often partially barren. *Tetraspores* tripartite, densely scattered over the lesser laciniæ and the accessory leaflets. *Colour* a fine purplish blood-red. *Substance* firmly membranaceous, thickish.

2. Rhodymenia *lanceolata,* Harv.; fronde (vix nota) . . . in lacinias lanceolatas elongatas basi et apice acutas integerrimas partita, cystocarpiis tetrasporisque per totam frondem densissime sparsis.

Hab. Port Cooper, Banks' Peninsula, *Lyall.*

We have only seen imperfect specimens of this seemingly distinct species. It may possibly be only a variety of the preceding, but the substance is softer, and the cortical layer more developed. *Laciniæ* 6–8 inches long, quite simple, ½ an inch to an inch broad, tapering, but not considerably, to the base and the acute apex. *Colour* a purplish blood-red.

3. Rhodymenia *epymenioides,* Harv.; stipite brevissimo cartilagineo in frondis costa mox evanescente prolongato, fronde tenui-membranacea rosea dichotoma flabelliformi basi cuneata costata, laciniis cuneato-linearibus patentibus obtusis rotundatis v. marginatis, fructu . . . ?

Hab. On stems of *Ascidiæ,* Otago Harbour, *Lyall.*

Stipes ½ inch long, cartilaginous, prolonged as an evanescent rib, into the cuneate base of the many times dichotomous, flabelliform frond. *Laciniæ* ½ inch wide, linear or somewhat cuneate, very obtuse, the axils sometimes rounded, sometimes subacute. *Colour* rosy-red. *Substance* delicately membranous, thin, adhering to paper. *Cells* of the medullary stratum large, thin-walled, rapidly expanding when moistened.—It is difficult, by a character, to distinguish this plant from *R. dichotoma,* but the microscopic appearance is different. Here the cells rapidly expand when a thin slice is moistened, whilst they are opened with much difficulty in *R. dichotoma.* Our present plant strongly resembles *Epymenia obtusa,* but the substance is thinner, and the structure different. *Fruit* unknown.

4. Rhodymenia *corallina,* Grev. *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 475. *Mont. Voy. Pôle Sud, p.* 155. *J. Ag. Sp. Alg. v.* 2. *p.* 379. Sphærococcus corallinus, *Bory, Voy. Coq. p.* 175. *t.* 16. *Rich. Voy. Astr. N. Zeal. p.* 3.

Hab. D'Urville Island, Cook's Straits, and East Coast, lat. 43°, *Lyall.* (Native of Chili.)

Our specimens are without fruit, and more densely tufted than usual.

5. Rhodymenia *dichotoma,* Hook. fil. et Harv., *Fl. Ant. v.* 1. *p.* 186. *t.* 72. *f.* 1. Callophyllis dichotoma, *Kütz. Sp. Alg. p.* 746.

Hab. Dredged in eight fathoms, Queen Charlotte's Sound, *Lyall.* (Native of the Auckland Islands.)

6. Rhodymenia *linearis,* J. Ag., *Sp. Alg. v.* 2. *p.* 379. R. Palmetta, *Hook. fil. et Harv. Lond. J. Bot. v.* 7. *p.* 444. (*nec Ag.*)

HAB. East Coast, *Colenso.* Otago, *Lyall.* Auckland Islands, *Turnbull.* (Native of South Africa?)

This is only to be known from *R. Palmetta* by the apiculated conceptacles, scattered over the laciniæ. The first specimens we received were without fruit, and we mistook them. Mr. Colenso has recently sent us fruiting specimens. The sori of tetraspores are terminal, as in *R. Palmetta*, and the individuals that bear them are broader and less compound than the others.

7. Rhodymenia *prolifera*, Harv.; stipite brevi mox in basi cuneata frondis desinente, lamina dichotoma, laciniis patentibus linearibus vel subcuneatis parum divisis apice proliferis, foliolis linearibus subacutis basi attenuatis simplicibus vel furcatis sæpe pedicellatis, cystocarpiis hemisphæricis sparsis, soris indefinitis ab apice attenuato remotis.

HAB. Hawke's Bay, *Colenso.*

Allied to *P. linearis*, but larger, of thicker substance, with differently placed tetraspores and generally proliferous; the foliations stipitate, simple or forked. *Frond* 4–8 inches long, distantly forked; the axils rounded; the laciniæ from ¼ inch to nearly 1 inch wide in the widest part. *Colour*, when dry, a dull brownish-red.

TRIBE XI. *CRYPTONEMIACEÆ.*

Gen. LXXII. STENOGRAMMA, *Harv.*

(Harv. Bot. Beechey Voy. p. 408. Phyc. Brit. t. 157. Mont. in Duch. Rev. Bot. p. 481. Kütz. Sp. Alg. p. 873. J. Ag. Sp. Alg. ii. 390.)

1. Stenogramma *interrupta*, Mont. *in Duch. Rev. Bot.* 1846, *p.* 483. *Harv. Phyc. Brit. t.* 157. *Kütz. Sp. Alg. p.* 873. *J. Ag. Sp. Alg. v.* 2. *p.* 391. S. Californica, *Harv. Beechey, p.* 408. *Kütz. Sp. p.* 874. Delesseria interrupta, *Ag. Syst. p.* 250. *Mont. in Webb. Ot. Hisp. t.* 8.

HAB. East Coast, *Colenso.* Blind Bay, Cook's Straits, and Chalky Bay, West Coast, *Lyall.* (Native of Spain, South of England, South of Ireland, Keys of Florida and California.)

Splendid specimens, with both kinds of fruit.

Gen. LXXIII. EPYMENIA, *Kütz.*

(Kütz. Sp. Alg. p. 787. J. Ag. Sp. Alg. ii. 219.)

1. Epymenia *obtusa*, Kütz., *Sp. Alg. p.* 787. *J. Ag. Sp. Alg. p.* 220. Phyllophora obtusa, *Grev. Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 187, *et v.* 2. *p.* 486.

HAB. East Coast, *Colenso, Lyall.* (Native of Cape of Good Hope, and Antarctic shores.)

Dr. Lyall's specimens have narrower and less divided segments than usual, some of them narrowed to an obtuse point; but we have Cape of Good Hope individuals nearly similar.

2. Epymenia *acuta*, Harv.; fronde basi cuneata alte et valide costata flabelliformi pluries dichotoma, laciniis patentibus lato-linearibus apice attenuatis subacutis.

HAB. Akaroa, *Lyall.*

Frond 5–6 inches high, flabelliform, subfastigiate, cuneate at the base, repeatedly dichotomous, with a strong rib, which branches at the principal lobes, one branch running up each segment, and vanishing about the middle. *Segments* patent, $\frac{1}{3}$–$\frac{1}{2}$ inch broad, linear, the ultimate ones attenuate to an acute or subobtuse point.—Possibly only a variety of *E. obtusa*, but a smaller and more strongly ribbed plant.

Gen. LXXIV. GYMNOGONGRUS, *Mart.*

(Mart. Bras. p. 27. J. Ag. Sp. Alg. ii. p. 313. *Tylocarpus, Oncotylus,* et *Chondri* sp., Kütz.)

1. Gymnogongrus *furcellatus,* J. Ag., *Sp. Alg. v.* 2. *p.* 318. Sphærococcus furcellatus, *Ag. Syst. p.* 217. *Kütz. Sp. Alg. p.* 737. Gracilaria furcata *et* G. torulosa, *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 545, *et v.* 7. *p.* 444.

HAB. Not uncommon, *Colenso, Lyall.* (West coast of South America.)

A very variable plant, of which we have now received several varieties. Our former specimens were imperfect, and led us into error.

2. Gymnogongrus *vermicularis,* J. Ag., *Sp. Alg. v.* 2. *p.* 323. Chondrus vermicularis, *Grev. Kütz. Sp. Alg. p.* 739. Fucus vermicularis, *Turn. Hist. t.* 221.

HAB. Milford Haven, *Lyall.* (Cape of Good Hope, and western South America.)

Some specimens of Mr. Colenso's, from Hawke's Bay, belong to this genus, but are too imperfect to be satisfactorily described.

Gen. LXXV. CALLOPHYLLIS, *Kütz.*

(Kütz. Phyc. Gen. p. 400. Sp. Alg. p. 744. J. Ag. Sp. Alg. ii. 296. *Rhodymeniæ* sp., Auct.)

1. Callophyllis *variegata,* Kütz., *Sp. Alg. p.* 745. *J. Ag. Sp. Alg. v.* 2. *p.* 302. Rhodymenia variegata, *Mont. Pôle Sud, p.* 156. *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 475. Sphærococcus variegatus, *Bory, Coq. t.* 14.

HAB. Tauranga, *Davies.* (Antarctic shores, and extratropical South America.)

2. Callophyllis *erosa,* Hook. fil. et Harv.; fronde sublineari pinnato-dichotoma decomposita nunc creberrime nunc distanter ramosa, laciniis erecto-patentibus plus minus compositis elongatis lobulis marginalibus eroso-dentatis lacinulatisve ornatis, axillis omnibus rotundatis apicibusque acutis, cystocarpiis sphæricis ad marginem sessilibus. (TAB. CXVIII.)

HAB. Foveaux Straits, and Port Cooper, *Lyall.*

Variable in habit, sometimes very densely, sometimes distantly branched, 6–12 inches long, the principal laciniæ from $\frac{1}{4}$ to $\frac{1}{2}$ an inch wide, erecto-patent or very erect, between pinnate and dichotomous, or alternately decompound. *Frond* often margined with small, eroso-dentate lobules. *Conceptacles* sessile on the edge of the frond, projecting beyond the margin. *Colour* a fine purple-crimson.—It adheres to paper in drying.—PLATE CXVIII. Fig. 1, plant, *natural size;* 2, portion of a lacinia with marginal conceptacles; 3, section of the frond; 4, tetraspores:—*more or less magnified.*

3. Callophyllis *asperata,* Harv.; fronde tenui-membranacea subsessili flabelliformi dichotomo-palmata subfastigiata, laciniis sursum latioribus apiceque crenato-multifidis margine simplici vel crispo et fimbriato, lamina processibus ciliiformibus pluribus asperata, cystocarpiis sphærico-convexis disco frondis immersis.

HAB. Port Nicholson, Cook's Straits, *Lyall.*

Frond 4–5 inches long, sessile, flabelliform and fastigiate, repeatedly dichotomous or subpalmately decompound; the segments $\frac{1}{2}$–1 inch wide, broader upwards, crenato-multifid at the expanded and fastigiate apex. The margin is either flat or much curled, sometimes ciliiferous: the lamina is very generally asperated with minute, scattered, subulate processes. *Conceptacles* scattered over the disc. *Colour* a rosy crimson. *Substance* delicately membranaceous, closely adhering to paper in drying.

4. Callophyllis *coccinea,* Harv. *in Lond. J. Bot. v.* 6. *p.* 405. *Kütz. Sp. Alg. p.* 746. *J. Ag. Sp. Alg. v.* 2. *p.* 301.

HAB. Tauranga, *Davies.* (Tasmania.)

5. Callophyllis *Hombroniana*, Kütz., *Sp. Alg. p.* 746. *J. Ag. Sp. Alg. v.* 2. *p.* 303. Rhodymenia Hombroniana, *Mont. Pôle Sud, p.* 157. *t.* 1. *f.* 2. *Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 186. *t.* 72. *f.* 2.

HAB. Foveaux Straits, *Lyall.* East Coast, *Colenso.* "A truly lovely *Alga*, sometimes two feet long," *Colenso.* (Auckland Islands.)

6. Callophyllis *acanthocarpa*, Harv.; fronde basi cuneata palmatim vel subdichotome fissa vel in laciniis pluribus vage partita, laciniis patentibus sæpissime fimbriatis, fimbriis indivisis vel multifidis aculeatis, cystocarpiis marginalibus vel in fimbrillis immersis aculeato-echinatis.

HAB. On stems of *Ascidia*, Middle Island and East Coast, and at Cape Cooper, *Lyall.* East Coast, *Colenso.*

Of this we have seen but few specimens, and, notwithstanding their peculiarities, we almost fear that they belong to a variety of *C. Hombroniana*, from which species the present, if permanently distinct, will chiefly differ in its aculeate conceptacles.

Gen. LXXVI. KALLYMENIA, *J. Ag.*

(J. Ag. Alg. Medit. p. 98. Harv. Phyc. Brit. t. 13. J. Ag. Sp. Alg. ii. 284. *Euhymenia*, Kütz. Sp. Alg. p. 741.)

1. Kallymenia *Harveyana*, J. Ag., *Sp. Alg. v.* 2. *p.* 288. Euhymenia Harveyana, *Kütz. Sp. Alg. p.* 743.

HAB. Blind Bay, Cook's Straits, *Lyall.* (Native of the Cape of Good Hope.)

A single specimen only, found by Dr. Lyall.

Gen. LXXVII. GIGARTINA, *Lamour.*

(J. Ag. Sp. Alg. ii. 260. Harv. Ner. Bor. Amer. pt. 2. p. 174.)

1. Gigartina *pistillata*, Lamour. *J. Ag. Sp. Alg. v.* 2. *p.* 264. *Kütz. Sp. Alg. p.* 749. *Mont. Pôle Sud, p.* 119. Gigartina divaricata, *Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 187.

Var. *β. dilatata*; stipite mox compresso sensim applanato cuneato in frondem lato-linearem planam dichotomam flabellatam desinente, laciniis distiche pinnatis, pinnulis divaricato-patentibus basi angustatis acutis vel obtusis.

Var. *γ. erinacea*; fronde applanata dichotomo-flabelliformi et distiche pinnata ramulis numerosissimis capsuliferis utrinque densissime echinata.

HAB. Several localities round the coast, *Colenso, Lyall.* (Native of South of Europe; and of Cornwall, England, in one spot only.)

Had we not a suite of specimens connecting these very remarkable varieties with the ordinary state of the species, which also occurs, but seemingly more rarely, at New Zealand, we should not have ventured to bring together plants which at first sight are so different. Our variety *dilatata*, in its broadest state, has segments fully half an inch in breadth, and quite flat. Though our specimens of *G. divaricata* are few and imperfect, we fear they must be referred to one of the varying forms of the species.

2. Gigartina *Chapmanni*, Hook. fil. et Harv.; fronde teretiuscula filiformi siccitate compresso-canaliculata alterne decomposita ramosissima, ramis flexuosis vage divisis, ramulis sparsis subulatis divaricato-patentibus. (TAB. CXIX. *B.*).

HAB. Maketu, *Chapman.*

We have seen but a solitary specimen, and should probably have referred it to *G. acicularis*, but that the frond is much more slender, not much thicker than hog's-bristle, and much more branched than in any state of *G. acicularis*

known to us. Two inches long.—PLATE CXIX. *B*. Fig. 1, plant, *the natural size*; 2, a branch and ramuli, *magnified*; 3, cross section of a fragment of the frond, *highly magnified*.

3. Gigartina *decipiens*, Hook. fil. et Harv.—Iridæa decipiens, *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 547. *J. Ag. Sp. Alg. v.* 2. *p.* 257. *Kütz. Sp. Alg. p.* 728.

HAB. New Zealand, *Raoul*.

4. Gigartina *ancistroclada*, Mont., *Voy. Pôle Sud, p.* 121. *t.* 7. *f.* 4. *Kütz. Sp. Alg. p.* 751. *J. Ag. Sp. Alg. v.* 2. *p.* 272.

HAB. Akaroa, *D'Urville*. Otago, *Lyall*.

5. Gigartina *alveata*, J. Ag., *Sp. Alg. v.* 2. *p.* 271. Chondrus alveatus, *Grev. Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 547. Fucus alveatus, *Turn. Hist. t.* 239.

HAB. New Zealand, *Banks, Cunningham, J. D. H.*

6. Gigartina *livida*, J. Ag., *Sp. Alg. v.* 2. *p.* 270. *Mont. Pôle Sud, p.* 120. *Hook. fil. et Harv. Lond. J. Bot. v.* 6. *p.* 407. Fucus lividus, *Turn. Hist. t.* 254.

HAB. Paroa Bay, Otago, and Jackson's Bay, *Lyall*. (Native of Tasmania.)

7. Gigartina *Chauvinii*, J. Ag., *Sp. Alg. v.* 2. *p.* 268. *Mont. Bonit. p.* 72. Sphærococcus Chauvinii, *Bory*; *Coq. t.* 20.

HAB. New Zealand, *D'Urville*. (Native of extratropical South America.)

8. Gigartina *stiriata*, A. Ag., *Sp. Alg. v.* 2. *p.* 277. Iridæa stiriata, *Bory. Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 547. Fucus stiriatus, *Turn. Hist. t.* 16.

HAB. Paroa Bay, *Lyall*. (Native of the Cape of Good Hope.)

9. Gigartina *Radula*, J. Ag., *Sp. Alg. v.* 2. *p.* 278. Mastocarpus Radula *et* bracteatus, *et* Chondrodictyon Capense, *Kütz.* Iridæa Radula, *Bory, Coq. p.* 107. *Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 188, *et v.* 2. *p.* 485. Fucus bracteatus, *Turn. Hist. t.* 25.

HAB. Bay of Islands, etc., *J. D. H.* (Native of the Cape of Good Hope and Pacific Ocean.)

Gen. LXXVIII. IRIDÆA, *Bory*.

(Bory, Coq. p. 103 (excl. sp.). J. Ag. Sp. Alg. ii. 250. Harv. Ner. Bor. Amer. pt. 2. p. 178.)

1. Iridæa *micans*, Bory, *Voy. Coq. p.* 110. *t.* 13 *et* 13 *bis*. *Mont. Voy. Pôle Sud, p.* 104. *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *pp.* 263, 548.

HAB. Akaroa, *D'Urville*. (Antarctic shores and South America.)

2. Iridæa *lanceolata*, Harv.; frondibus gregariis corneo-membranaceis, stipite lineari-cuneato foliolis pinnato in laminam lanceolatam attenuatam undato-crispatam purpureo-sanguineam sensim dilatato.

HAB. Otago, *Lyall*.

Fronds many from the same base, 1–2 feet long, rising with a linear-cuneate, flat stipes, about 1 inch long and 1 or 2 lines broad, which is pinnated with patent, linear, or lanceolate leaflets, and gradually widens into the base of the lamina. *Lamina* lanceolate, gradually tapering to each end, 1–3 inches broad, undate and variously crisped. *Colour* a purplish-red, brightening in fresh water. *Substance* rather rigid. It imperfectly adheres to paper. *Fruit* unknown.—Allied to *I. laminarioides*, but seemingly distinct.

3. Iridæa *lusoria*, Harv. Rhodymenia lusoria, *Grev. in Hook. Comp. Bot. Mag. v.* 2. *p.* 329. *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 544.

HAB. East Coast, *Cunningham*.

Our specimens are very imperfect, but have the structure of frond proper to this genus.

Gen. LXXIX. HALYMENIA, *Ag. ref.*

(J. Ag. Alg. Medit. p. 95; Sp. Alg. ii. 197. Harv. Ner. Bor. Amer. pt. 2. p. 192.)

1. Halymenia *Novæ-Zelandiæ,* Mont., *Voy. Pôle Sud, p.* 11. *Kütz. Sp. Alg. p.* 716. *J. Ag. Sp. Alg. v.* 2. *p.* 207. H. Urvilleana, *Mont. l. c. t.* 12. *f.* 2.

HAB. Akaroa, *D'Urville.*

Unknown to us, unless our *Nemastoma Daviesii* be a synonym.

Gen. LXXX. CHRYSYMENIA, *J. Ag.*

(J. Ag. Alg. Medit. p. 105; Sp. Alg. ii. 209. Harv. Ner. Bor. Amer. pt. 2. p. 187.)

1. Chrysymenia? *polydactyla,* Hook. fil. et Harv.; caule filiformi solido subdichotome decomposito ramosissimo ramulis lineari-fusiformibus basi et apice subacutis simplicibus tubulosis pinnatim obsito? fructu . . . ? (TAB. CXIX. *A.*)

HAB. South Harbour, Southern Island, *Lyall.*

Stem 3–4 inches long, twice as thick as hog's-bristle at the base, attenuated upwards, solid, much branched, between dichotomous and alternate, the larger branches angularly flexuous, the lesser straight, virgate, alternate or secund. *Branches* densely set with alternate, secund, or somewhat fasciculate, finger-like, hollow ramuli, subacute at the base and apex. *Substance* firmly membranaceous, scarcely adhering to paper in drying. *Colour* a dull, dark purplish-red. No *fruit* seen.—Apparently related to *C. uvaria;* but until the fruit be discovered, the genus must be doubtful.—PLATE CXIX. *A.* Fig. 1, plant, *natural size;* 2, apex of a branch and hollow ramuli; 3, cross section of a branch; 4, cross section of a ramulus; 5, tetraspores:—*all more or less magnified.*

Gen. LXXXI. CHYLOCLADIA, *J. Ag.*

(J. Ag. Sp. Alg. ii. 360. Harv. Ner. Bor. Amer. pt. 2. p. 185.)

1. Chylocladia *umbellata,* Hook. fil. et Harv.; fronde tereti subtrichotoma, ramis primariis apice hamatis infra apicem latere convexo ramos sæpius ternos quaternosve emittentibus, ramis minoribus basi constrictis clavatis curvatis apice ramulis ter-quaternis vesiculæformibus coronatis. (TAB. CXIX. *C.*)

HAB. Port Underwood, Cook's Straits, *Lyall.*

Fronds 1–2 inches long, about ½ a line in diameter, terete, trichotomous, all the primary branches curved and hooked at the summit, and emitting, below the apex on the convex side, three or four erect, linear-clavate, slightly curved, lesser branches. These either throw out a second set from their apex, or are crowned with three or four small, ovate or oblong, obtuse ramuli, which no doubt lengthen into clavate branches. *Colour* a dull purple.—Allied to *C. articulata,* but very distinct.—PLATE CXIX. *C.* Fig. 1, plant, *natural size;* 2, umbellate ramuli; 3, cross section of a ramulus; 4, structure of the frond:—*more or less magnified.*

2. Chylocladia *secunda,* Hook. fil. et Harv. Chrysymenia secunda, *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 548.

HAB. Akaroa, *Raoul.* Port Cooper, Banks' Peninsula, *Lyall.*

Can this be *Dumontia pusilla,* Mont. Pôle Sud, p. 105. t. 13. f. 2?

3. Chylocladia? *cæspitosa,* Harv.; cæspitosa, parvula, caule curvato arcuato (radicante?) ramos erectos opposite pinnatos v. verticillatim ramosos emittente, ramulis fusiformibus oppositis vel quaternis basi parum constrictis apice attenuatis acutis majoribus curvatis.

HAB. Port Nicholson, *Lyall.*

A doubtful species, requiring further examination. We have seen but one immature specimen. It may possibly be only a variety of *C. clavellosa,* though the occasionally quaternate ramuli are unlike that species.

Gen. LXXXII. DASYPHLŒA, *Mont.*

(Mont. Voy. Pôle Sud, p. 100. J. Ag. Sp. Alg. ii. 215.)

1. Dasyphlœa *insignis*, Mont., *Pôle Sud, p.* 102. *t.* 8. *f.* 3. *Kütz. Sp. Alg. p.* 757. *J. Ag. Sp. Alg. v.* 2. *p.* 215.

HAB. Akaroa, *D'Urville.*

Gen. LXXXIII. DUMONTIA, *Lamour.*

(J. Ag. Sp. Alg. ii. 348.)

1. Dumontia *filiformis*, Grev., *Alg. Brit. p.* 165. *t.* 17. *Harv. Phyc. Brit. t.* 95, *et Sup. t.* 357. *J. Ag. Sp. Alg. v.* 2. *p.* 350. *Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 189.

HAB. Tidal rocks, Tuingara, near Cape Turnagain, *Colenso.* (Native of Europe.)

Gen. LXXXIV. CATENELLA, *Grev.*

(Grev. Alg. Brit. p. 166. t. 17. J. Ag. Alg. Medit. p. 89; Sp. Alg. ii. 351. Kütz. Phyc. Gen. t. 76. f. 4. Harv. Ner. Bor. Amer. pt. 2. p. 201.)

1. Catenella *Opuntia*, Grev., *Alg. Brit. p.* 166. *Harv. Phyc. Brit. t.* 88. *J. Ag. Sp. Alg. v.* 1. *p.* 352. *Kütz. Sp. Alg. p.* 724. Fucus Opuntia, *Turn. Hist. t.* 107.

HAB. Bay of Islands, *J. D. H.* (Native of Europe.)

Gen. LXXXV. PRIONITIS, *J. Ag.*

(J. Ag. Sp. Alg. ii. 185. Harv. Ner. Bor. Amer. pt. 2. p. 197.)

1. Prionitis *Colensoi*, Hook. fil. et Harv.; fronde plana lato-lineari nigrescente vage subpinnatim composita, ramis suboppositis patentibus basi angustatis extra medium dilatatis margineque eroso-dentatis vel fimbriato-lobulatis, lobulis apice denticulatis vel simplicibus inæqualibus crebris, apicibus obtusis axillisque rotundatis. (TAB. CXX. *A.*)

HAB. Rocks near Cape Turnagain, *Colenso.*

Fronds 6–8 inches long, ½ inch broad, branched from the base, irregularly pinnate. *Branches* 3–4 inches long, flat, opposite or irregular, narrowed below, dilated beyond the middle, and thence linear-oblong, obtuse or somewhat attenuated. In the lower part the margin is simple, above it is fimbriate or lacero-dentate, the lobes minute, 1–2 lines long, denticulate at the dilated apex. *Structure* as in the genus. *Fruit* unknown. *Colour*, when dry, very dark brown, or nearly black. *Substance* rigid.—It does not adhere to paper in drying.—PLATE CXX. *A.* Fig. 1, plant, *natural size*; 2, section of the frond, *highly magnified.*

Gen. LXXXVI. NEMASTOMA, *J. Ag.*

(J. Ag. Alg. Medit. p. 89; Sp. Alg. ii. 162. *Gymnophlœa*, Kütz.)

1. Nemastoma (Aræotes) *intestinalis*, Harv.; fronde succosa (strato medullari laxissimo) compresso-tubulosa lineari vage ramosa, ramis intestinæformibus simplicibus furcatisve basi constrictis apice attenuatis acutis, favellis per totam frondem sparsis plexu denso filorum circumdatis.

HAB. On rocks, Preservation Harbour, *Lyall.*

Fronds 6–8 inches long, ¼–⅓ inch wide, compressed (?), cylindrical, divided irregularly into three or four simple or once-forked branches, which are constricted at their insertion, and taper to an acute point, sometimes tipped with a pair of mucrones, which probably lengthen into branches. *Substance* very thin and delicate, full of

viscid matter. The medullary stratum consists of a few, very slender, distant, anastomosing filaments; the exterior of a reticulated plexus passing off into the periphery in moniliform filaments. *Colour* a purplish-red. It closely adheres to paper in drying. *Favellæ* suspended below the periphery, and enclosed in a dense plexus of filaments.

2. Nemastoma? *attenuata*, Harv.; fronde (simplici?) carnoso-membranacea succosa (strato medullari laxo) compressa lineari-attenuata, tetrasporis cruciatis sparsis.

HAB. Jackson's Bay, *Lyall.*

Of this we have only seen an imperfect specimen, about fifteen inches long, and a third of an inch wide in the lower part, from which it gradually tapers to the apex. It is either the upper part of a simple frond, or a portion of a branch of a slightly divided one. In either case it seems nearly related to *N. intestinalis*, but is of much thicker and firmer substance, and quite distinct.

3. Nemastoma *pinnata*, Hook. fil. et Harv.; fronde plana carnoso-membranacea decomposite pinnata, pinnis patentibus suboppositis lineari-lanceolatis basi et apice longe attenuatis, pinnulis filiformibus inæqualibus subhorizontalibus, tetrasporis cruciatis sparsis. (TAB. CXX. *B.*)

HAB. Akaroa, *Lyall.* (Only one specimen.)

Frond 4–5 inches long, and about as much in the expansion of the branches, undivided or once forked, closely and pretty regularly pinnated throughout; the pinnæ distichous, opposite or subalternate, patent, much attenuated to each end, two or three lines broad at the widest part, pinnulated with subhorizontal, ciliiform pinnules of irregular length. *Tetraspores* cruciate, dispersed. *Medullary stratum* tolerably compact, passing off at the outward edge into a network of anastomosing filaments, from which spring the moniliform peripheric filaments. *Substance* soft. *Colour* a pale red.—It closely adheres to the paper in drying.—PLATE CXX. *B.* Fig. 1, plant, *natural size;* 2, section of the frond; 3, a tetraspore:—*both highly magnified.*

4. Nemastoma *Daviesii*, Harv.; fronde stipitata foliacea gelatinoso-membranacea ovato-lanceolata subpinnata disticha, rachide simplici vel furcata, pinnis lato-lanceolatis vel subovatis basi et apice attenuatis undato-crispatis patentibus dentatis v. ciliatis, favellis numerosissimis per frondem sparsis.

HAB. Tauranga, *Davies.* Port Underwood, *Lyall.*

Frond 6–8 inches long, expanded, leaf-like, more or less regularly pinnate, the principal rachis from $\frac{1}{2}$–$1\frac{1}{2}$ inch wide, oblong or lanceolate, or irregularly sinuate, pinnated with numerous, lateral, ovato-lanceolate lobes, $\frac{1}{2}$ inch to an inch wide, 2–4 inches long, crisped and curled, irregularly dentate, lobulate or margined with ciliiform processes. All the divisions taper to the base and apex. *Colour* purplish-red, changing to blood-red. *Substance* gelatinoso-membranaceous, closely adhering to paper. *Favellæ*, on one of our specimens, very abundant.

5. Nemastoma *endiviæfolia*, Harv.; fronde e basi cuneata vage dichotoma vel palmatifida et laciniata, nunc anguste lineari multifida apicibus acutis tri-quadrifurcatis, nunc latifolia subpinnatim ramosa laciniis lateralibus palmatifidis vel dichotomis integerrimis vel eroso-denticulatis acutis vel abrupte truncatis, axillis rotundatis, tetrasporis cruciatis sparsis.

HAB. Blind Bay and Port Nicholson, *Lyall.*

Excessively variable in form, and perhaps passing into *N. Daviesii*, from which, in its typical state, it looks very different. A larger suite of specimens than we possess would be required to connect the various individuals we have here brought together, more from the sum of probabilities than from exact evidence. Scarcely two are precisely similar.

6. Nemastoma *prolifera*, Harv.; fronde (speciminibus mancis tantum visis) cuneata vage ramosa gelatinoso-membranacea viscida, lamina applanata foliolis parvis filiformibus vel cuneatis simplicibus multifidisque fimbriata et utrinque densissime obsessa.

HAB. On stones, Akaroa, *Lyall.*

A single broken specimen only, apparently the upper half of a frond, has been seen. It is about 8 inches long,

1 inch broad at the truncate base, gradually widening upwards to two inches, then forking; the segments being about ¾ of an inch wide. Every part is densely beset with filiform or cuneato-multifid leaflets, less than an inch in length, and the margin is fringed with similar processes. *Substance* delicately gelatinoso-membranaceous; when fresh, "covered with viscid matter" (D. L.). *Structure* as in the genus; the medullary stratum rather lax.

Tribe XII. *SPYRIDIACEÆ.*

Gen. LXXXVII. SPYRIDIA.

(Harv. in Hook. Br. Fl. ii. 336; Man. 300. Phyc. Brit. t. 46. J. Ag. Sp. Alg. ii. 338. Kütz. Sp. Alg. p. 665.)

1. Spyridia *opposita,* Harv.; fronde filiformi decomposite ramosissima, ramis ramulisque ramellis oppositis densissime obsitis, ramellis crebris imbricatis incurvis subdecussatim oppositis vix distichis nec basi angustatis apice acutis simplicibus, articulis ramellorum diametro æqualibus.—*Harv. in Herb. T. C. D.*

Hab. Chalky Bay, West Coast, *Lyall.* (Native of South Australia, *Mrs. Eddington.*)

Stems 3–4 inches high, filiform, much branched and bushy, branches and their divisions mostly alternate, the lesser branches virgate. All the younger parts are densely clothed with robust, dark red ramelli, opposite each other in insertion, but not strictly distichous and yet scarcely tetrastichous. *Ramelli* a line long, incurved, tapering to the acute, simple apex, but not constricted at the base. *Fruit* unknown.—The first specimens we received of this species were collected in South Australia, near Cape Northumberland, by Mrs. Eddington.

Tribe XIII. *CERAMIACEÆ.*

Gen. LXXXVIII. CERAMIUM, *Roth.*

(J. Ag. Sp. Alg. ii. 113. *Homoceras, Gongroceras, Trichoceras, Celeceras, Echinoceras, Acanthoceras, Ceramium* et *Pteroceras,* Kütz.)

1. Ceramium *cancellatum,* Ag., *Sp. Alg. v.* 2. *p.* 145. *Hook. fil. et Harv. Lond. J. Bot. v.* 4. *p.* 550. *Fl. Ant. v.* 1. *p.* 191. *J. Ag. Sp. Alg. v.* 2. *p.* 136. Pteroceras cancellatum, *Kütz. Sp. Alg. p.* 690.

Hab. On various parts of the coast, common, *Lyall, Colenso, Davies, Chapman, etc.* (Native of Cape of Good Hope.)

We have many varieties from various localities.

2. Ceramium *virgatum,* Hook. fil. et Harv., *Lond. J. Bot. v.* 7. *p.* 445. *J. Ag. Sp. Alg. v.* 2. *p.* 137.

Hab. Parasitical on *Carpophyllum,* East Coast, *Colenso.*

3. Ceramium *vestitum,* Harv.; fronde setacea obsoletissime articulata vel continua, ramis ramulis capillaribus quaquaversis dichotomo-multifidis densissime vestitis, articulis ramulorum dense corticatis (vix conspicuis v. omnino obscuris) diametro æqualibus, axillis patentibus, apicibus patentibus rectis.

Hab. Port Adventure, Southern Island, *Lyall.*

It is not without much hesitation that we propose this species, founded on a solitary specimen. The stature is that of *C. rubrum,* to whose variety *proliferum* it may be compared; but here the ramuli are much more slender in proportion to the main branches, much more densely corticated, scarcely obviously articulate, and the apices are straighter. It seems to us to be at least as good a species as *C. obsoletum,* Ag.

4. Ceramium *rubrum,* Ag., *Syn. p.* 60. *J. Ag. Sp. Alg. v.* 2. *p.* 127. *Kütz. Sp. Alg. p.* 685. *Harv. Phyc. Brit. t.* 181. Conferva rubra, *E. Bot. t.* 1166. *Dillw. Conf. t.* 34.

Hab. On all the coasts, many varieties, common. (Generally diffused.)

5. Ceramium *diaphanum,* Roth. *J. Ag. Sp. Alg. v.* 2. *p.* 125. *Harv. Phyc. Brit. t.* 193. Conferva diaphana, *Dillw. Conf. t.* 38. *E. Bot. t.* 1742. Homoceras pulchellum, *Kütz.*

Hab. Port Cooper, Akaroa, and Otago, *Lyall.* (Cape of Good Hope and Northern Atlantic.)

6. Ceramium *uncinatum*, Harv.; fronde ultracapillari regulariter dichotoma fastigiata, axillis patentibus apicibusque forcipatis, articulis inferioribus diametro 3–4-plo longioribus interstitiis pellucidis nudis, geniculis nodoso-elevatis spinula singula articulata subulata uncinato-recurva crassa exteriore latere necnon spinella (nunc obsoleta) interiore latere opposita armatis, tetrasporis . . .

Hab. Cook's Straits, *Lyall.* Cape Turnagain, etc., *Colenso.*

Allied to *C. acanthonotum*, but much more robust, with strongly swollen nodes and recurved or hooked thorns, and very frequently furnished with a minute thorn on the inner face of the branch. We consider it a distinctly marked species.

Gen. LXXXIX. CENTROCERAS, *Kütz.*

(Kütz. Linnæa, 1841, p. 741. Phyc. Gen. p. 381. Sp. Alg. p. 688. J. Ag. Sp. Alg. ii. 147. Harv. Ner. Bor. Amer. pt. 2. f. 211.)

1. Centroceras *clavulatum*, Mont. *Fl. Alg. p.* 140. *J. Ag. Sp. Alg. v.* 2. *p.* 148. *Harv. Ner. Bor. Amer. pt.* 2. *p.* 211. *t.* 33 *C.* Ceramium clavulatum, *Ag. Mont. Cuba, t.* 2. *f.* 1.

Hab. Common on the coast, *Colenso, Lyall, etc.* (Tropical and subtropical seas.)

Gen. XC. PTILOTA, *Ag.*

(Sp. Alg. i. 384. Endl. 3rd Suppl. p. 36. Mont. Voy. Pôle Sud, p. 97. Hook. fil. et Harv. Fl. Ant. i. 190. J. Ag. Sp. Alg. ii. 92. *Ptilota, Rhodocallis*, et *Euptilota*, Kütz.)

1. Ptilota *formosissima*, Mont., *Voy. Pôle Sud, p.* 97. *t.* 9. *f.* 3. *Hook. fil. et Harv. Fl. Ant. v.* 1. *p.* 190. *t.* 77. *J. Ag. Sp. Alg. v.* 2. *p.* 102. Euptilota formosissima, *Kütz. Sp. Alg. p.* 671.

Var. *β*; ramis circumscriptione lineari-lanceolatis.

Hab. Very abundant, *Lyall, Colenso, etc.* (Auckland Islands.)

2. Ptilota *pellucida*, Harv.; fronde filiformi disticha decomposite pinnata, ramis primariis apicem versus ecorticatis bi-tripinnatis, pinnis articulatis monosiphoniis oppositis inæqualibus, una indivisa, altera pinnatim partita vel unilateraliter pectinata, pinnellis filiformibus basi constrictis subacutis, articulis diametro sesqui-duplo-longioribus.

Hab. Otago, and East Coast of Southern Island, *Lyall.*

Frond 2–3 inches long, ovate in outline, closely branched, and three or four times pinnate. Primary branches alternate, each of them opposed by a minute, undivided ramulus, or by a very short, simply pinnate branchlet, which is rarely more than two or three lines long; oppositely bi-tripinnate, one pinna of each pair being constantly developed and compound, the other either very much smaller and less compound, or remaining unchanged as a simple ramulus. The upper portion of the branches for some distance below the apex is visibly articulated, and nearly ecorticated, and the smaller branches are still more pellucid, the rachides of the penultimate pinnæ being destitute of cortical cells. *Articulations* of the pinnæ once and a half to twice as long as broad. *Fruit* unknown. *Colour* bright rosy-red.—A beautiful species, allied to *P. Harveyi*, but more pellucid, with longer articulations, and a different ramification. It also seems related to the *Callithamnion Ptilota* of 'Flora Antarctica,' the favellæ of which are unknown, and which is probably a *Ptilota.* We dare not, however, at present unite it to that species, of which we possess but very imperfect specimens.

Gen. XCI. BALLIA, *Harv.*

(Harv. in Hook. Lond. J. Bot. ii. 191. Mont. Voy. Pôle Sud, p. 94. Hook. fil. et Harv. Fl. Ant. i. 190. J. Ag. Sp. Alg. ii. 74. Kütz. Sp. Alg. p. 663.)

1. Ballia *callitricha*, Mont., *Pôle Sud, p.* 94. *Kütz. Sp. Alg. p.* 663. *J. Ag. Sp. Alg. v.* 2. *p.* 75.

Ballia Brunonis, *Harv. l. c. t.* 9. B. Hombroniana, *Mont. Pôle Sud, t.* 12. *f.* 1. Sphacelaria callitricha, *Ag. Sp. Alg. v.* 2. *p.* 23. *Ic. Alg. Eur. t.* 6.

HAB. Many varieties common on the coast. (Southern Ocean, south of 34°.)

Gen. XCII. GRIFFITHSIA, *Ag.*

(Ag. Sp. Alg. ii. 126. J. Ag. Sp. ii. 75. Kütz. Sp. Alg. p. 659. Hook. fil. et Harv. Fl. Ant. i. 191, ii. 488.)

1. Griffithsia *setacea*, Ag., *Sp. Alg. v.* 2. *p.* 129. *J. Ag. Sp. Alg. v.* 2. *p.* 84. *Kütz. Sp. Alg. p.* 660. *Harv. Phyc. Brit. t.* 184. Conferva setacea, *Ellis. E. Bot. t.* 1689. *Dillw. Conf. t.* 82.

Var. *β. filiformis;* filis tenuioribus articulisque longioribus (fructu ignoto). G. filiformis, *MS.*

HAB. Foveaux Straits and East Coast, *Lyall, Colenso.* Var. *β*, at Port Cooper, Banks' Peninsula, and Bluff Harbour, etc., *Lyall.* (Atlantic Ocean, in temperate latitudes.)

2. Griffithsia *antarctica*, Hook. fil. et Harv.; filis crassis cæspitosis dichotomis flaccidis, axillis inferioribus patentibus superioribus acutis, ramis elongatis erectis ramulisque nudis sæpe secundis ad nodos constrictis, articulis cylindraceis superne paulo incrassatis ramorum diametro 4–6-plo ramulorum subtriplo longioribus, ramulis fructiferis lateralibus articulo brevissimo constantibus involucro umbellato coronatis, tetrasporis non visis.—*Fl. Ant. v.* 2. *p.* 488. *J. Ag. Sp. Alg. v.* 2. *p.* 87.

Var. *β. fastigiata;* ramis minoribus decompositis flabelliformibus fastigiatis ramulisque sæpe secundis.

HAB. East Coast, *Colenso.* Ruapuke, Foveaux Straits, and East Coast, *Lyall.*

Gen. XCIII. CALLITHAMNION, *Lyngb.*

(Lyngb. Hyd. Dan. p. 122. Ag. Sp. Alg. ii. 156. J. Ag. Sp. Alg. ii. 5. Harv. Phyc. Brit. et Man. Hook. fil. et Harv. Fl. Ant. i. 191, ii. 489. *Callithamnion* et *Phlæbothamnion*, Kütz. Sp. Alg. p. 638.)

1. Callithamnion *flaccidum*, Hook. fil. et Harv. *Fl. Ant. v.* 2. *p,* 490. *t.* 188. *f.* 1. *Kütz. Sp. Alg. p.* 648. *J. Ag. Sp. Alg. v.* 2. *p.* 31.

HAB. Port Otago, *Lyall.* (Native of Cape Horn.)

2. Callithamnion *Plumula*, Lyngb. *Hyd. Dan. p.* 127. *Alg. Sp. Alg. v.* 2. *p.* 159. *J. Ag. Sp. Alg. v.* 2. *p.* 29. *Harv. Phyc. Brit. t.* 242. *Kütz. Sp. Alg. p.* 647. Conferva Plumula, *Ellis. Dillw. Conf. t.* 50.

HAB. Dredged in five fathoms, D'Urville Island, *Lyall.* (Native of Cape Horn; Europe and North America.)

3. Callithamnion *applicitum*, Harv.; minutissimum, repens et decumbens, fronde distiche pinnatim composita, pinnis oppositis pinnulatis vel bipinnulatis, pinnulis creberrimis obtusis, articulis ramorum cylindraceis diametro triplo longioribus pinnularum diametro brevioribus.

HAB. Parasitical on *Amphiroa, Colenso.*

Fronds 2–6 lines long, exceedingly slender, prostrate, and attached by the whole under surface to the coralline on which they grow, decompound, pinnate, and distichous. All the divisions opposite. *Articulations* of the branches cylindrical, filled with endochrome, 3–4 times as long as broad; of the pinnæ hexagonal, about as long as broad; of the pinnules quadrate, shorter than their breadth. Basal reticulation of branches and pinnæ shorter than the rest. *Colour* rosy-red. *Substance* soft, decomposing.—Very much more minute in all its parts than *C. australe*, and of a softer substance. A very pretty microscopic object.

4. Callithamnion *hirtum*, Hook. fil. et Harv., *Fl. Ant. v.* 1. *p.* 192. *t.* 78. *f.* 2. *Kütz. Sp. Alg. p.* 655. *J. Ag. Sp. Alg. v.* 2. *p.* 53.

Hab. Port Cooper, Otago, Port William, Tory Channel, and Port Underwood, *Lyall.* (Native of Auckland Islands.)

5. Callithamnion *scoparium*, Hook. fil. et Harv., *Fl. Ant. v.* 2. *p.* 490. *t.* 189. *f.* 3. *J. Ag. Sp. Alg. v.* 2. *p.* 35. Phlebothamnion scoparium, *Kütz. Sp. Alg. p.* 656.

Hab. Preservation Harbour, West Coast, and Foveaux Straits, *Lyall.* East Coast, *Colenso.* (Native of Falkland Islands, and Cape Horn.)

6. Callithamnion *Colensoi*, Harv.; fronde robusta dendroidea atropurpurea, caule ultrasetaceo corticato quaquaversum lateraliter ramoso, ramis sursum longe corticatis apice articulatis ramulis brevibus dichotomo-multifidis imbricatis squarrosis densissime obsessis, ramellis divaricatis subulatis acutis alternis, articulis ramulorum diametro sesquilongioribus.

Hab. East Coast, and Hawke's Bay, *Colenso.*

Our specimens are not in good order, but are sufficient to establish this as a species quite different from any other New Zealand one. It is allied, however, to *C. purpuriferum* of the Cape of Good Hope, *C. Montagnei* of Cape Horn, *C. Pikeanum* of California, and *C. Arbuscula* of the North of Europe; but appears distinct from all these. *Frond* dendroid, 2–3 inches high, the main stem as thick as sparrow's-quill below, attenuated upwards. All the branches are densely clothed on every side with minute, squarrose, very compound ramuli. *Colour* blackish when dry.

7. Callithamnion *brachygonum*, Harv.; fronde capillari (basi vix setacea) alterne divisa quaquaversum ramosa e basi fere ecorticata, ramis elongatis virgatis subsimplicibus iterum alterne ramosis dense plumulatis, plumulis elongatis linearibus angustis pinnatis vel bipinnatis, ramulis brevibus sensim attenuatis subacutis erecto-patentibus, articulis ramorum diametro 2–3-plo, pinnarum subduplo longioribus, pinnularum diametro æqualibus v. sesquilongioribus, tetrasporis globosis secus ramulos seriatis.

Hab. Blind Bay, *Lyall.* Tauranga, *Davies.*

One or two inches high, densely tufted, flaccid, bright carmine-red. *Stem* subsimple, set on all sides with lateral, similar branches, which bear a second or third series of similar, rod-like branchlets, the last series of which are clothed with subdistichous plumules. *Plumules* very narrow, erecto-patent, the lowermost simply pinnate, the upper gradually longer and more compound, those near the middle of the branches very long and bipinnate. All the articulations are short; those of the stem and branches veinless, with a narrow endochrome and thick walls. *Tetraspores* line the inner faces of the ramuli.—A distinct and pretty little species.

8. Callithamnion *puniceum*, Harv.; fronde subcapillari flaccida decomposite ramosissima basi tantum corticata, ramis multoties pinnatim compositis alternis, plumulis oblongis patentibus basi pinnatis apice bipinnatis corymboso-fastigiatisque, pinnulis subulatis acutis (e basi latiore sensim attenuatis), articulis primariis diametro 8–10-plo longioribus pellucidis vel venulosis, secundariis brevioribus, ramulorum diametro 2–3-plo longioribus, tetrasporis solitariis ad ramulos lateralibus.

Hab. Tauranga, *Davies.*

Densely tufted, 2–3 inches long, excessively branched, inextricable. *Stem* and branches decompound, pinnate, the upper divisions at least distichous. *Plumules* short, patent, either simply pinnate, or the lower half pinnate and the upper bipinnate. *Ramuli* remarkably tapering from a broad base to an acute point, patent. *Substance* very tender. *Colour* a fine purple-lake.—We are unable to give a more satisfactory character of this plant, which nevertheless seems not exactly similar to any with which we are acquainted. Our specimens are somewhat decayed.

9. Callithamnion *consanguineum*, Harv.; fronde subcapillari decomposite ramosissima, ramis primariis quaquaversum egredientibus sursum longe corticatis, secundariis subdistichis alterne pinnatim compositis articulatis basi nudis apice distiche plumulatis, plumulis fastigiatis basi nudis extra medium pinnatis, pinnis

patentibus, reticulis ramorum diametro subtriplo, ramulorum duplo longioribus, apicibus obtusis, tetrasporis lateralibus subsolitariis triangulipartitis.

Hab. Port Nicholson, *Lyall.*

Densely tufted, 2–3 inches high, thinner than human hair, excessively branched, the larger branches spreading every way, the lesser gradually more distichous upwards, alternately decompound-pinnate. *Stem* and *branches* opaque with veins, the lesser branches alone pellucidly articulate, decompound-pinnate, and alternately plumulate. *Plumules* short, fan-shaped, naked below, pinnate above, the terminal pinnæ very close together. *Articulations* twice or thrice as long as broad, those of the branches longest. *Colour* a rosy-purple. *Substance* rather flaccid, adhering to paper.

10. Callithamnion *byssoideum,* Arn. *Harv. Phyc. Brit. t.* 262. *Wyatt, Alg. Danm. no.* 185. *J. Ag. Sp. Alg. v.* 2. *p.* 40. Phlebothamnion byssoides, *Kütz. Sp. Alg. p.* 657.

Hab. Bluff Harbour, Foveaux Straits, and at Otago, *Lyall.* Maketu, *Chapman.* (Native of Europe and North America.)

We had at first regarded these specimens as representing a distinct species, which we should have name *C. tenerrimum,* but on re-examination we fear they approach the northern *C. byssoideum* too nearly to be kept separate.

11. Callithamnion *Rothii,* Lyngb., *Hyd. Dan. p.* 129. *t.* 41. *Harv. Phyc. Brit. t.* 120 *B. Kütz. Sp. Alg. p.* 640. *J. Ag. Sp. Alg. v.* 2. *p.* 17. Conferva Rothii, *Dillw. Conf. t.* 73. *E. Bot. t.* 1702.

Hab. On tidal rocks, and in caverns, Hawke's Bay, and Cape Kidnapper, *Colenso.* (Native of Europe and North America.)

Series III. CHLOROSPERMEÆ.

Tribe I. *SIPHONEÆ.*

Gen. XCIV. CAULERPA, *Lamour.*

(Lamour. Ann. Mus. xx. 282. Ag. Sp. i. 433. Endl. 3rd Suppl. p. 16. Kütz. Sp. Alg. p. 495. *Phyllerpa,* Kütz. *Chanoinia,* Bory, etc.)

1. Caulerpa *Brownii,* Endl.; caule vestito, ramis elongatis dichotomis, ramulis (foliis) cylindraceis basi subconstrictis erecto-patentibus quadrifariam imbricatis mucronulatis obtusisve. (Tab. CXXI. *A.*)

Hab. Lyall's Bay and Chalky Bay, *Lyall.* New Zealand, *Colenso.* (Native of New Holland.)

A larger and more branching plant than the following, with simple ramuli. Some specimens, however, are almost intermediate in character between the extreme forms of these supposed species.—Plate CXXI. *A.* Fig. 1, plant, *natural size;* 2, four verticillate ramuli; 3, a ramulus; 4, apex of another ramulus, to show that they are sometimes blunt:—*all magnified.*

2. Caulerpa *furcifolia,* Hook. fil. et Harv., *Lond. J. Bot. v.* 6. *p.* 416. Caulerpa Selago, *Nobis, l. c. v.* 4. *p.* 550 (excl. syn.). (Tab. CXXI. *B.*)

Hab. New Zealand, *Colenso.* (Native of Tasmania.)

Our figure represents the typical form, such as we have also received from Tasmania, and formerly described in Hooker's London Journal. On some specimens recently examined, we find *simple* cylindrical ramuli mixed with the forked ones, a variation which materially weakens the specific character.—Plate CXXI. *B.* Fig. 1, plant, *natural size;* 2, four verticillate ramuli; 3, a ramulus:—*both magnified.*

3. Caulerpa *hypnoides,* Ag., *Sp. Alg. v.* 1. *p.* 443. *Endl. 3rd Suppl. p.* 16. Chauvinia hypnoides, *Kütz. Sp. Alg. p.* 497. Fucus hypnoides, *Turn. Hist. t.* 173.

Hab. East Coast, *Colenso.* (Native of New Holland.)

4. Caulerpa *sedoides*, Ag., *Sp. Alg. v.* 1. *p.* 438. *Endl.* 3*rd Suppl. p.* 16. Chauvinia sedoides, *Kütz. Sp. Alg. p.* 498. Fucus sedoides, *Turn. t.* 172.

HAB. Lyall's Bay, Cook's Straits, *Lyall*. New Zealand, *Colenso*. (Native of tropical and subtropical seas.)

5. Caulerpa *articulata*, Harv.; caule . . . . , ramis erectis gracilibus indivisis vel parum ramosis articulato-constrictis, ramulis oppositis distichis cylindraceis obtusis basi maxime constrictis patentibus e quoque articulo ortis.

HAB. East Coast, rare, *Colenso*.

We have not seen the creeping stems. Our specimens consist of branches, 4–5 inches long, twice as thick as hog's-bristle, simple or forked, regularly articulato-constricted at intervals of one or two lines, clothed with leaf-like ramuli throughout. *Ramuli* opposite, distichous, two springing from above the middle of each internode, half an inch long, cylindrical, obtuse, very much constricted at their insertion, as thick as the branches, bright green. A distinct and beautiful species.

Gen. XCV. CODIUM, *Stackh.*

(Stackh. Ner. Brit. p. 24. Ag. Sp. Alg. i. 451. Kütz. Sp. Alg. p. 500. *Lamarckia*, Olivi. *Agardhia*, Cabr. *Spongodium*, Lamour.)

1. Codium *tomentosum*, Ag., *Sp. Alg. v.* 1. *p.* 451. *Kütz. Sp. Alg. p.* 500. *Harv. Phyc. Brit. t.* 93. Fucus tomentosus, *Turn. Hist. t.* 135. *E. Bot. t.* 712.

HAB. Port Nicholson, *Lyall*. Tauranga, *Davies*. East Coast, *Colenso*. (Generally diffused.)

2. Codium *adhærens*, Ag., *Sp. v.* 1. *p.* 457. *Kütz. Sp. Alg. p.* 502. *Harv. Phyc. Brit. t.* 35 *A.*

HAB. Banks' Peninsula, *Lyall*. Outer rocks, Cape Kidnapper, *Colenso*. (Native of Europe; Cape of Good Hope, Mauritius, etc.)

Gen. XCVI. BRYOPSIS, *Lamour.*

(Lamour. Ann. Mus. xx. 281. Ag. Sp. Alg. i. 446. Endl. 3rd Suppl. p. 20. Kütz. Sp. Alg. p. 490.)

1. Bryopsis *plumosa*, Ag., *Sp. Alg. v.* 1. *p.* 488. *Kütz. Sp. Alg. p.* 493. *Harv. Phyc. Brit. t.* 3. Ulva plumosa, *E. Bot. t.* 2375.

HAB. Cook's Straits, and Akaroa Harbour, and Otago, *Lyall*, who sends three or four varieties. (Northern Atlantic.)

Gen. XCVII. VAUCHERIA, *DC.*

(DC. Fl. Franc. p. 62. Lyngb. Hyd. Dan. p. 75. Ag. Sp. Alg. i. 458. Kütz. Sp. Alg. p. 486. *Ectosperma*, Vauch.)

1. Vaucheria *Dillwynii*, Ag., *Sp. v.* 1. *p.* 463. *Kütz. Sp. Alg. p.* 487. *Grev. Alg. Brit. t.* 19. Conferva frigida, *Dillw. Conf. t.* 16.

HAB. On damp ground, *Colenso*. (Europe.)

Dr. Lyall and Mr. Colenso have sent specimens of perhaps two or three species of this genus, but not in a state in which they can be satisfactorily determined.

TRIBE II. *BATRACHOSPERMEÆ.*

Gen. XCVIII. BATRACHOSPERMUM, *Roth.*

(Roth, Fl. Germ. iii. 480. Ag. Syst. p. 23. Endl. 3rd Suppl. p. 22. Kütz. Sp. Alg. p. 535.)

1. Batrachospermum *moniliforme*, Roth. *Ag. Syst. p.* 53. *Kütz. Sp. Alg. p.* 535. Conferva gelatinosa, *Dillw. Conf. t.* 32.

Hab. In running streams of fresh water, Canterbury Plains, *Lyall.* New Zealand, *Colenso.* (Europe and North America.)

Tribe III. *CONFERVACEÆ.*

Gen. XCIX. CLADOPHORA, *Kütz.*

(Kütz. Phyc. Gen. p. 269. Sp. Alg. p. 387. Harv. Phyc. Brit.)

1. Cladophora *herpestica,* Kütz., *Sp. Alg. p.* 415. Conferva herpestica, *Mont. Voy. Pôle Sud, Crypt. p.* 6. *Hook. fil. et Harv. in Lond. J. Bot. v.* 4. *p.* 551.

Hab. Bay of Islands, *Hombron, J. D. H.* Cape Kidnapper, *Colenso.*

2. Cladophora *Lyallii,* Harv.; densissime pulvinata, effusa, filis vix uncialibus crassissimis rigidis subfastigiatis intricatis flexuosis vage ramosis, ramis alternis secundisve nunc oppositis patentibus, ramulis paucis sæpe secundis, apicibus obtusis, articulis diametro sesquilongioribus ad genicula constrictis. (Tab. CXXI. *C.*)

Hab. South Island, *Lyall.*

Forming widely effused, very dense, mat-like tufts, composed of rigid, very thick, interwoven filaments, less than an inch in length, decumbent at the base, then erect. These filaments are very irregularly branched; the branches patent, very frequently secund, sometimes opposite, or alternate. *Ramuli* few, of three or four articulations. *Articulations* constricted at the very narrow dissepiments, about once and a half as long as broad in all parts of the frond. *Apices* very obtuse. *Colour* a pale yellowish-green.—It does not adhere to paper in drying.—Plate CXXI. *C.* Fig. 1, part of a mat of *Cladophora Lyallii, natural size;* 2, part of a branching filament, *magnified;* 3, apex of a ramulus, *highly magnified.*

3. Cladophora *pellucida,* Kütz., *Sp. Alg. p.* 390. *Harv. Phyc. Brit. t.* 174. Cladophora catenifera, *Kg. l. c.* Conferva pellucida, *Dillw. Conf. t.* 90.

Hab. Waitemata Harbour, *Lyall.* (Native of Europe, and of the Cape of Good Hope.)

Of this plant we have only seen a fragment about 1 inch in length, but closely agreeing with some of our British specimens of this strongly marked species. We are not disposed to separate the Cape of Good Hope specimens on which Kützing founds his *C. catenifera.*—Any one conversant with *C. pellucida* must know that, though true to certain broadly marked characters, it puts on several forms, and varies, in the same locality, in diameter and in the comparative length of the articulations.

4. Cladophora *verticillata,* Hook. fil. et Harv., *Fl. Ant. v.* 1. *p.* 193. *Kütz. Sp. Alg. p.* 388.

Hab. In a cave, Port William, *Lyall.* (Native of the Auckland Islands.)

These specimens are fully eight inches long. In other respects they agree with the Auckland Islands specimens formerly described.

5. Cladophora *Colensoi,* Harv.; filis nigro-viridibus rigidis gracilibus flexuosis e basi decompositis, ramis elongatis curvatis parum divisis basi nudis apice ramulosis, ramulis sæpissime secundis appressis abbreviatis vel longiusculis, articulis endochromate denso repletis diametro 3–4-plo longioribus.

Hab. Hawke's Bay, rare, *Colenso.*

Filaments 2 inches high, not densely tufted, nor very much branched. *Branches* springing a short distance from the base, numerous, but little divided, often quite simple, flexuous, with a few lateral branches, and more or less clothed with short, secund, very erect, or close-pressed ramuli. *Articulations* nearly of the same length in all parts of the frond, cylindrical, not contracted at the joints, filled with endochrome, which recovers its form on remoistening; the cell-walls thick and rigid. *Colour* a dark green.—It does not adhere to paper in drying. It is allied to *C. rupestris,* but more slender and flexuous.

6. Cladophora *Daviesii,* Harv.; filis læte viridibus rigidis crassiusculis vage ramosissimis, ramis alterne vel dichotome ramosis basi longe nudis apice crebre ramulosis, ramulis secunde multifidis corymboso-fasciculatis, axillis ramorum rotundatis, articulis diametro sesqui- vel duplo longioribus siccitate sæpe alterne compressis.

Hab. Tauranga, *Colenso.*

Filaments 4–5 inches long, densely tufted, much branched. *Branches* alternately or subdichotomously divided, frequently quite bare of ramuli for a considerable distance above and below the principal forks, and chiefly bearing ramuli near the summits, where they are crowded, somewhat corymbose, short, and very densely inserted, being generally secund, and consisting of two or three articulations. *Substance* rigidly membranaceous, not adhering to paper. *Colour* a beautifully clear, bright green. *Membrane* thin. *Articulations* uniformly short in all parts of the frond, seldom more than twice as long as broad. *Axillæ* remarkably rounded and broad.—Of this, which most resembles some of the forms of *C. Hutchinsiæ,* we have as yet seen but two specimens.

7. Cladophora *gracilis,* Griff., *in Wyatt, Alg. Danm. No.* 97. *Harv. Phyc. Brit. t.* 18. *Kütz. Sp. Alg. p.* 403.

Hab. Port William, Southern Island, *Lyall.* (Native of Europe.)

Dr. Lyall's specimens are 14–15 inches long, and closely resemble the most luxuriant ones from the south of England, except that they are still more slender, with rather longer articulations, and longer and more distant ramuli. We are not disposed to separate them specifically; at least, not without further evidence than can be derived from the two or three specimens we have yet seen.

8. Cladophora *crinalis,* Harv.; cæspite brevi basi intricata densissima intense-viridi crinali, filis tenuibus rigidiusculis siccitate nitidulis decompositis, ramis ramulisque erectis vel appressis strictis parum divisis, ramulis sparsis obtusis, articulis diametro 4–6-plo longioribus ad genicula constrictis.

Hab. New Zealand, *Colenso.*

Tufts 1–2 inches high, very dense, intricate at the base. *Filaments* slender, decompound, but not very much branched, all the divisions remarkably straight and erect; the ramuli few, scattered, short or long. *Articulations* constricted at the dissepiments, in the lower part six or eight times as long as broad, in the upper four to six times, with a thin tube, more or less completely filled with deep-green endochrome, which does not perfectly recover its form. —It imperfectly adheres to paper in drying.

Gen. C. CONFERVA, *Ag.*

1. Conferva (Chætomorpha) *Darwinii,* Kütz., *Sp. Alg. p.* 380. Conferva clavata, *var.* Darwinii, *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 493. *t.* 192. *f.* 1.

Hab. East Coast, *Lyall, Colenso.*

2. Conferva (Chætomorpha) *aerea,* Dillw., *Conf. t.* 80. *E. Bot. t.* 1929. *Harv. Phyc. Brit. t.* 99 *B. Ag. Syst. p.* 100. *Kütz. Sp. Alg. p.* 379. *Wyatt, Alg. Danm. No.* 190.

Hab. Houraki Gulf, *Lyall.* (Native of Europe.)

3. Conferva *valida,* Hook. fil. et Harv., *in Lond. J. Bot. v.* 6. *p.* 416. *Kütz. Sp. Alg. p.* 379.

Hab. Port William, Southern Island, *Lyall.*

Gen. CI. TYNDARIDEA, *Bory.*

(Bory, Dict. Class. i. 495. Harv. in Hook. Br. Fl. ii. 361.)

1. Tyndaridea *anomala,* Ralfs *in E. Bot. Suppl. t.* 2899. *Hass. Br. Fresh W. Alg. p.* 161. *t.* 38. *f.* 2, 3. Zygogonium anomalum, *Kütz. Sp. Alg. p.* 447.

Hab. In fresh water, *Colenso.* (Native of England?)

So far as a badly dried specimen allows us to decide, this does not differ from the English plant.

2. Tyndaridea? *byssoidea,* Harv.; filis arachnoideis nigricantibus gelatinosis, articulis diametro subtriplo longioribus.

Hab. In a fresh-water lake, Kapiti, Cook's Straits, *Lyall.*

We do not like to omit all notice of this species, and yet feel that the character given is quite insufficient to distinguish it. Our specimens are not in conjugation. The endochrome has contracted into a mass, with faint indications of bination, either in the centre or end of the articulation. Under the microscope it has a greenish tinge. To the naked eye the colour is smoky.

Tribe IV. *ULVACEÆ.*

Gen. CII. PORPHYRA, *Ag.*

(Ag. Syst. xxxii. Endl. 3rd Suppl. p. 19. Harv. Phyc. Brit. t. 92. p. 211. Kütz. Sp. Alg. p. 691, excl. sp.)

1. Porphyra *laciniata,* Ag., *Syst. p.* 190. *Ag. Ic. Alg. Eur. t.* 26, 27. *Harv. Phyc. Brit. t.* 92. *Kütz. Sp. Alg. p.* 692.

Hab. Cook's Straits and Banks' Peninsula, *Lyall.* (Generally diffused.)

2. Porphyra *vulgaris,* Ag., *Aufz. p.* 18. *Grev. Alg. Brit. p.* 169. *Harv. Phyc. Brit. t.* 211. *Kütz. Sp. Alg. p.* 692. Porphyra linearis, *Grev. Alg. p.* 170. *t.* 18 (the young plant.)

Hab. Cape Kidnapper, etc., *Colenso.* (Generally diffused.)

Gen. CIII. BANGIA, *Lyngb.*

(Lyngb. Hyd. Dan. p. 82. Ag. Syst. p. 25. Grev. Alg. Brit. p. 177. Harv. Phyc. Brit. t. 96, etc. Kütz. Sp. Alg. p. 358.)

1. Bangia *ciliaris,* Carm., *MSS. Hook. Br. Fl. v.* 2. *p.* 316. *Harv. Phyc. Brit. t.* 322.

Hab. On leaves of *Zostera,* Cook's Straits, *Lyall.* (Native of Europe.)

This forms a dense fringe to the margin of the leaves. The fronds in our specimens are nearly ½ an inch long, and very variable in breadth. Some have one or two rows of cells, as is common in the British plant; others have the middle part of the frond flattened into a leafy expansion, with many rows of irregularly-shaped cells; and others have pretty wide, uniformly flattened fronds.

2. Bangia *lanuginosa,* Harv.; filis (parasiticis) minutis curvatis cylindraceis, cellulis purpureis uniseriatis diametro subduplo brevioribus.

Hab. Parasitical on *Chordaria sordida, Colenso.*

This covers the *Chordaria* with a dense, purple coat, about a line or two in length. *Filaments* curled, cylindrical, containing a single row of bright purple, lenticular cells, considerably shorter than their diameter. *Substance* soft and gelatinous.—Allied to *B. ceramicola,* but smaller, with much shorter and more densely-set cells. Except in colour, it does not differ from *Lyngbya* (*Hormotridia*).

Gen. CIV. ENTEROMORPHA, *Link.*

(Link. in Hor. Phys. p. 5. Harv. Phyc. Brit. *Solenia,* Ag. Syst. xxxii. Kütz. Sp. Alg. p. 478.)

1. Enteromorpha *compressa,* Grev., *Alg. Brit. p.* 180. *t.* 18. *Harv. Phyc. Brit.* t. 335. *Kütz. Sp. Alg. p.* 480. Solenia compressa, *Alg. Syst. p.* 186.

Hab. Sea-shores, abundant. Very variable in form and size. (Generally diffused.)

2. Enteromorpha *intestinalis,* Link, *Hor. Phys. Ber. p.* 5. *Grev. Alg. Brit. p.* 179. *E. Bot. Suppl. t.* 2756. *Harv. Phyc. Brit. t.* 154.

Hab. Sea-shores, with the preceding, from which it only differs in having an unbranched frond. Generally diffused.)

3. Enteromorpha *clathrata*, var. *ramulosa*. E. ramulosa, *Hook. Br. Fl. v.* 2. *p.* 315. *Harv. Phyc. Brit. t.* 245.

Hab. Otago, *Lyall*. (Europe, etc.)

Gen. CV. ULVA, *Ag.*

(Ag. Syst. xxxii. Grev. Alg. Brit. p. 171. Harv. Phyc. Brit. *Ulva, Phycoseris,* et *Prasiola,* Kütz. Sp. Alg. p. 472, etc.)

1. Ulva (Phycoseris) *lobata*, Kütz., *Sp. Alg. p.* 477. (*An* Phycoseris rigida? *Kg.* Ulva rigida? *Ag.*)

Hab. Sea-shores, *Colenso*. (Cape of Good Hope.)

This is perhaps only a variety of *U. rigida*, as we had at first named our specimens. We have very similar ones from the Cape of Good Hope, which appear to be referable to Kützing's var. *Africana* of his *P. lobata*, to which therefore we refer our plant.

2. Ulva *latissima*, Linn., *Fl. Suec. p.* 433. *Ag. Sp. Alg. v.* 1. *p.* 407. *Harv. Phyc. Brit. t.* 171. *Kütz. Sp. Alg. p.* 474.

Hab. Sea-shores, common. (Generally diffused.)

3. Ulva *bullosa?* Roth, *Cat. Bot. v.* 3. *p.* 329. *Grev. Alg. Brit. p.* 174.

Hab. On stones, under water, *Colenso*. (Europe.)

A few young specimens, which seem to belong to this or an allied species.

4. Ulva (Prasiola) *crispa*, Lightf., *Fl. Scot. p.* 972. *Ag. Sp. Alg. v.* 1. *p.* 416. *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 498.

Hab. Port Cooper, *Lyall*. (Generally diffused.)

Tribe V. *OSCILLATORIEÆ.*

Gen. CVI. CALOTHRIX, *Ag.*

(Ag. Syst. xxiv. Harv. Phyc. Brit. Endl. 3rd Suppl. p. 13.)

1. Calothrix *scopulorum*, Ag., *Syst. p.* 70. *Harv. Phyc. Brit. t.* 58 *B.* Schizosiphon scopulorum, *Kütz. Sp. Alg. p.* 329.

Hab. Sea-shores, on rocks and mud, near high-water mark, common, *Colenso*. (Generally diffused.)

Gen. CVII. OSCILLATORIA, *Vauch.*

(Vauch. Conf. t. 15. Ag. Syst. xxiv. Harv. Phyc. Brit. *Oscillaria*, Bosc. Endl. 3rd Suppl. Kütz. Sp. Alg. p. 237.)

1. Oscillatoria ——?

Mr. Colenso sends us a species of this genus, which we have not sufficient specimens to determine.

Gen. CVIII. TOLYPOTHRIX, *Kütz.*

1. Tolypothrix *irregularis*, Berk.; filis æruginosis irregularibus hic illic constrictis l. torulosis sæpe attenuatis, annulis angustissimis.

Hab. Amongst patches of *Vaucheria*, on tidal mud, *Colenso*.

Threads very irregular, $\frac{1}{2000}$–$\frac{1}{2250}$ inch across, compressed, sometimes constricted, sometimes torulose, often

attenuated above or below, furnished at the base with a minute, hyaline, elliptic connecting-joint. *Fruit-rings* very narrow.—*M. J. B.*

Tribe VI. *NOSTOCHINEÆ.*

Gen. CIX. NOSTOC, *Vauch.*

(Vauch. Conf. p. 203. Ag. Syst. xviii. Kütz. Sp. Alg. p. 295.)

1. Nostoc *verrucosum,* Vauch., *Conf. p.* 225. *t.* 16. *f.* 3. *Kütz. Sp. Alg. p.* 300.

Hab. In fresh-water streams, Canterbury Plains, *Lyall.* (Europe and North America.)

Nat. Ord. CIV. LICHENES.

By the Rev. Churchill Babington, B.D., F.L.S.

The following enumeration of New Zealand *Lichenes* and *Byssaceæ* comprises about 150 species, of which at least 100 are also found in Britain. The term *species* is here taken in the larger sense; for a much greater number of *forms,* often easily to be recognized, undoubtedly occur in the country. Thus the first species, *Usnea barbata,* comprises six Acharian species, or, as I should call them, slightly differing forms. This catalogue, though probably sufficiently complete to give a general notion of the distribution of genera in the country, and of their relative magnitudes, to some extent does, notwithstanding, I am firmly convinced, fall considerably below the true number of species inhabiting the islands; in fact, there is no doubt that specimens, which I am unable to name satisfactorily, and yet am unwilling to describe as new, belong to species not occurring in the following pages. In no class of plants is there so great a liability to error as in the Lichens: in no class of plants ought new species to be proposed with greater caution,—it may almost be said, with greater reluctance. There are enough, and too many, bad species in this Order already, and it is to be feared that a few may have here been added to the number. The remark of a great botanist, though somewhat paradoxically expressed, has a truth underlying it: "In other tribes of plants, the more we study them the more species we discover: among Lichens, the more we study them the fewer we find them."

It thus becomes clear that the lichenological flora of a country requires to be studied by a native botanist, who may recognize a protean species by a knowledge of its living forms, or, as Fries expresses it, of its history. Without this knowledge, especially in the case of crustaceous Lichens, it is oftentimes hopeless to attempt to arrive at a clear result; and I am confident that the more difficult species of the southern hemisphere, even of the higher genera (of *Sticta,* for example) will never be properly elucidated, till they have been described and limited by some one who is familiar with them in a living state. I have strong suspicions that several species which have been here kept as distinct will prove to be only remarkable varieties of the same plant; and, on the other hand, I may have occasionally erred in reducing two or more described species to one. Even the European species of the more difficult genera are at present very ill understood.

The family of *Lichenes* is more cosmopolitan in its species than any other known tribe of plants; the more it is studied, the more this is found to be the case; and one reason why the variation of the species is sometimes so exceedingly great, is because many of them exist under almost every condition of latitude, altitude, and climate. The fact of their general distribution teaches also another lesson, that a lichenist should be slow to describe new species without some tolerable acquaintance with the Order generally. This remark has repeatedly forced itself upon my mind while engaged in the present work,

as I have from time to time found that a species which I had supposed new was already described by some other author, from another and sometimes very distant part of the world, leading me sincerely to wish that the task had fallen into abler hands. I must take this opportunity, however, of rendering my best thanks to that veteran and indefatigable cryptogamist Dr. Montagne, for having in several cases communicated to me his remarks on New Zealand Lichens, on which I desired his opinion: without his help the errors in the following pages would undoubtedly have been more numerous than they are. I have also been enabled, by the liberality with which he has from time to time communicated specimens of various exotic species described by him, to identify some of them with New Zealand species.

In comparing the New Zealand Lichen-flora with that of Great Britain, some remarkable features of contrariety as well as identity may be discovered. New Zealand possesses about thrice as many species of the genus *Sticta*, and perhaps nearly twice as many *Zeoræ*, as our own islands contain, as well as several species of *Nephroma*, *Parmelia*, *Stereocaulon*, and *Sphærophoron*, unknown to the northern hemisphere. The following genera, which are absent from Britain altogether, are found in New Zealand:—*Trypethelium*, *Porina*, *Myriangium*, and *Cœnogonium*, to which *Coccocarpia* should perhaps likewise be added. The black-fruited *Cladoniæ* (viz. *C. retipora* and *C. aggregata*) are also absent from Britain, being peculiar to the southern hemisphere.

The British Flora, on the other hand (which comprises perhaps at least 300 distinct species), boasts about a dozen species of *Calicium*, a genus having only a single representative in the Flora of New Zealand; indeed, so far as can be judged from the discoveries hitherto made, this genus appears to be extremely rare in the southern hemisphere generally. It has also divers *Cetrariæ*, *Everniæ*, *Peltigeræ*, *Stictæ*, *Parmeliæ*, and *Stereocaula* not hitherto found in New Zealand, to say nothing of the obscurer genera, many of whose British species may probably occur, though they have not hitherto been collected there. Nearly all the British genera occur in New Zealand; we should hardly insist on any as being probably absent, except *Roccella*, *Gyrophora*, and *Solorina*, although it is certainly somewhat singular that no *Opegrapha* has been collected (a single species of *Graphis* occurs): other small and obscure genera, such as *Coniocarpon*, *Sagedia*, and *Strigula*, will probably one day be found there. The *Lobaria* section of the genus *Sticta* (*S. pulmonacea* and its allies), though present over the Old and New World, from the Arctic circle to the southern tropics, seems to be absent from New Zealand, and probably from the temperate and colder regions of the south almost universally. (*S. pulmonacea*, however, is found at the Cape of Good Hope.)

I have but rarely introduced the specific characters of the Lichens hereinafter enumerated, except in the genus *Sticta*; unless they seemed to be new, or were described only in some rare work. Probably I might have added the characters of the species first described by Dr. Montagne in his various works, had I not been aware that it is his intention to publish in one volume the diagnoses of those cryptogamous plants which he has first described, accompanied by descriptions of species hitherto unpublished*. The principal books, therefore, that will be necessary to the student, in addition to the above, are the 'Lichenographia Europæa' of Fries, and the 'Synopsis Lichenum' of Acharius. The 'Lichenes Helvetici Exsiccati' of Schærer, containing 650 species and varieties of dried specimens of European (principally Swiss) Lichens, will be found exceedingly useful. His 'Enumeratio critica Lichenum Europæorum' is the latest descriptive work on European Lichens (published in 1850), and contains some information not to be found in Fries, from

* 'Sylloge Generum Specierumque Cryptogamarum quas in variis operibus descriptas iconibusque illustratas nunc ad diagnosim reductas nonnullasque novas interjectas ordine systematico disposuit C. Montagne.' The announcement states:—" Ce travail, qui est en voie d'exécution, ne paraîtra que l'année prochaine. Paris, 1 Novembre, 1852." I have not yet seen its publication announced.

whose treatise the *Byssaceæ* are excluded; at the same time, it is a very inferior production to the 'Lichenographia Europæa.' A general work on Lichens is most urgently required, and there is some reason to believe that an able hand is now engaged upon the task.

The sporidia of Lichens have of late occupied the attention of several distinguished botanists, both at home and abroad, and their researches seem in many cases to have produced good fruit; the different forms of these microscopic organs sometimes serving to distinguish allied species. In this department the names of Eschweiler, Montagne, Fée, Flotow, De Notaris, Leighton, Massalongo, and Nylander are to be mentioned with special commendation. I shall perhaps incur some reproach for not having dwelt more upon these microscopical characters in the remarks than I have done, although it will be seen that they are not neglected in the figures, and that they are also occasionally alluded to in my remarks and descriptions. It is perhaps presumptuous to offer an opinion on a subject with which I am not so familiar as the above-named authors are; but it appears clear that the employment of microscopic characters must be very cautiously introduced: it is certain that the forms of these organs vary considerably in the same species, even in the same specimen, as any one may convince himself by a little experience, or even by examining our plates; and I must own that I scarcely think that the examinations at present made are sufficiently extensive to enable a very accurate judgment to be formed as to how far supposed distinctions of this kind can be advantageously employed.

The arrangement here followed is substantially that of Fries. The latest classification of the European Lichens (in outline) is by Dr. Nylander, in the second volume of the 'Mémoires de la Société des Sciences Naturelles de Cherbourg' (1854): he makes a larger number of subdivisions and genera than appears necessary or advisable; but there can be no question about the ability with which the work is drawn up. Unfortunately both this and other tracts have come to hand since the following account was written, so that less use is made of them than probably might otherwise have been desirable.

The remarks on the geographical distribution have very frequently been based upon an inspection of specimens in Sir W. J. Hooker's herbarium and my own; but I have also constantly made use of the works of Fries and Tuckermann for Europe and North America; those of Montagne for the South Polar regions, Juan Fernandez, Guiana, Cuba, the Canaries, and the East Indies; and Eschweiler's labours in Martius' 'Flora of Brazil;' also of certain papers on Abyssinian, New Holland, and Cape of Good Hope species, in the 'Linnæa,' by Laurer and Flotow.—*C. B.*

Suborder I. GYMNOCARPI.

Tribe I. *PARMELIACEÆ.*

Gen. I. USNEA, *Ach. et Auctt.*

1. Usnea *barbata*, Fries, *Lich. Eur. p.* 18. Usnea florida, U. hirta, U. plicata, U. cornicularia, U. ceratina, U. barbata, *Ach. Syn. Lich. pp.* 302–307.

Hab. Abundant everywhere throughout all the Islands, and very variable.

The above Acharian species, all of which occur in New Zealand, do not appear to be even so much as well-marked varieties; *U. gracilis*, Ach., *U. Jamaicensis*, Ach., and *U. filaris*, Ach., are added as synonyms by Fries (the two former by Eschweiler also, in Mart. Fl. Brasil. p. 226), and *U. trichodea*, Ach., by Flörke, probably with great justice. *U. cornicularia*, described from New Zealand specimens of Forster, by Acharius, is, I presume, the same plant which Mr. Colenso has gathered, but I have no authentic specimen. The description in the 'Lichenographia Universalis' suits exceedingly well; the habit is that of *Evernia ochroleuca, d crinalis*, but it seems without doubt

to be a very flaccid and slender form of *U. plicata;* the apothecia are absent. Among the more notable forms is the var. *rubiginea*, remarkable for its bright red hue, especially after being moistened, and which is probably wholly due to damp after drying, for certain states of *U. melaxantha* change in the same manner if long exposed to moisture after preservation in a dry state; some specimens, again, approach var. *strigosa*, Ach. (*U. strigosa*, Pers.), but are less strigose than the South American form. Most lichenists are now agreed in uniting all or a considerable number of the Acharian species of European *Usneæ;* for example, MM. Fries, Schærer, Eschweiler, Wallroth, and Sir W. J. Hooker and Dr. Hooker among our countrymen. Dr. Montagne, however, in his learned labours on the Lichens of the Canary Islands, and on those of the South Polar regions, has kept several of them apart, and minutely pointed out their supposed differences. Mr. Tuckermann also, as well as Dr. Montagne, has contended for the distinctness of *U. ceratina*, Ach. Forms of this species occur in every part of the globe, and are greatly modified by climatic causes; some, indeed, are evidently wholly dependent on temperature and humidity for the size and appearance they assume.

2. Usnea *angulata*, Ach., *Syn. p.* 307. *Hook. fil. et Tayl. Lich. Ant. in Lond. Journ. Bot. v.* 3. *p.* 658.

HAB. Northern Island, *J. D. H.*, *Sinclair*. (Barren.)

This seems to be distinct from the preceding, and always to have an angular stem; but it cannot, I think, safely be disunited from *U. longissima*, Ach. (considered by Eschweiler and Schærer as a form of the *U. barbata*, Fries), which differs only in a somewhat less angular and pulverulent stem. I am indebted to M. Reichenbach for a specimen of each species. Dr. Taylor, forgetting that Acharius had described this plant, published his *U. angulata* as a new species, and chanced to give it the same specific name that Acharius had done. *U. angulata* occurs in North America and Tasmania, and the form *U. longissima* in North and South America (Brazil), in Europe (rarely), in Cappadocia (Tuckermann), and the Himalaya Mountains (Winterbottom!), the Cape, fertile (Tuckermann), Australia (Tuckermann), and Tasmania.

3. Usnea *melaxantha*, Ach., *Syn. p.* 303. *Fl. Antarct. p.* 250.

HAB. Northern Island, on the mountains, *Colenso*. Barren. (Setaceous, very dark form.)

For the synonyms and geographical distribution see 'Flora Antarctica,' pp. 519–21. *U. Taylori*, Hook.! l. c. p. 521, is perhaps only a very fine state of this plant; it is, as Dr. Montagne informs me, identical with *Neuropogon Pœppigii*, Nees. *U. sphacelata*, R. Brown!, should rather be considered as a form of *U. Taylori* than of *U. melaxantha*. The spores of the *U. melaxantha* have now at last been found by Dr. Montagne. Dr. Hooker suspects that this species, different as it usually is from our first species, may nevertheless be a form of it; it is not always easy to distinguish them.

Gen. II. EVERNIA, *Ach.*

1. Evernia *ochroleuca*, Fries, *Lich. Eur. p.* 22. Cornicularia, *Ach.*

HAB. Northern and Middle Islands, *Colenso*, *Bidwill*. Barren. (Typical form.)

Var. *crinalis*, Fries (*Alectoria crinalis*, Ach.), is mentioned by A. Richard as a New Zealand species, found by D'Urville.

For the geographical distribution see my remarks in Seemann's 'Botany of the Herald,' p. 47.

2. Evernia *flavicans*, Fries, *Lich. Eur. p.* 28. Borrera, *Ach.* Parmelia Sieberiana, *Laur.! in Linnæa*, 1827. *p.* 38. *t.* 1. *f.* 1.

HAB. Northern Island, *Colenso*. Barren. (Brightly coloured, glabrous form.)

Found in Western Europe, very rarely fertile (fruit seen in Guernsey by Mrs. Collings, and in Cornwall by Mr. Greenwood and others); in North America (Ohio), and South America (Brazil), Ascension, the Canaries,

and at the Cape, the apothecia being either naked or ciliated. Eschweiler can hardly be correct in considering this species as a form of *Borrera chrysophthalma*, Ach.

Gen. III. RAMALINA, *Ach.*

1. Ramalina *calicaris*, Fries, *Lich. Eur. p.* 30. Ramalina fraxinea, R. fastigiata, R. farinacea, *Ach. Syn. pp.* 296, 297.

Var. *β. membranacea*, Laur.!; "thallo plano lineari-laciniato pallido membranaceo utrinque lævi, apotheciis minutis submarginalibus carneo-pallidis margine integerrimo."—*Laur. in Linnæa*, 1827. *p.* 43.

Var. *γ. geniculata*, Bab.; "thallo laxe cæspitoso [subinflato] albido-cinereo glabro dichotomo ramosissimo, ramis intricatis lobis linearibus hinc concaviusculis acuminatis, gemmis (servediis) dispersis granulatis statim linearibus, apotheciis planis concoloribus margine tenui integerrimo, subtus thalli laciniam emittentibus."—*Tayl.* R. geniculata, *Tayl.! in Lond. Journ. Bot. ut supra.*

Hab. Northern and Middle Islands, *A. Cunningham, etc.* Var. *β. Colenso.* Var. *γ.* Bay of Islands, *J. D. H.*

Very variable, and probably abundant everywhere. The three above-named Acharian species are enumerated as natives of New Zealand by M. Raoul, and Mr. Colenso has collected specimens according tolerably well with each of them. The var. *β* is "a very common form in the southern hemisphere" (Fl. Ant. p. 522), and I have not seen any specimens except from that hemisphere. Well marked examples look exceedingly different from *R. fraxinea*; but there are numerous intermediate forms, and there can be no doubt that Laurer rightly considered the two plants to belong to one species. Var. *γ*, again, is "about 2 inches high; branches sometimes pierced with a series of minute holes; the apothecia are merely marginal, or more commonly a new branch of the thallus is sent off from beneath each," *Tayl. l. c.* This agrees substantially with the form commonly called *R. calicaris*, but is rather inflated than canaliculated, though it is both in some degree; the substance is very delicate and polished. The passage from this variety to *R. pusilla*, Fries, is easy; and I have no doubt (after inspecting a considerable number of specimens of the latter) that it is only an extreme and remarkable form of the cosmopolitan *R. calicaris*, Fries.

2. Ramalina *usneoides*, Fries, *Lich. Eur. App. p.* 468 (name only). Alectoria, *Ach.! Syn. p.* 292.

Hab. Northern Island, *J. D. H.*

A very different-looking plant from the preceding; and yet an inspection of a considerable number of specimens collected in Central America by Dr. Seemann has greatly shaken my confidence in it as a species. In this genus it is easy, and perhaps necessary, to give distinctive names to the extreme forms, but it seems very doubtful if any of them are permanent; they rather appear to belong to one archetypal species, our broad ribbon-like *R. fraxinea*, from which they have diverged into opposite directions, becoming stiff and terete in *R. scopulorum* and *R. polymorpha* (rock forms), or more or less delicate in texture, and indeed assuming every possible aspect. Dr. Montagne also has referred this plant to the genus *Ramalina*, but apparently without perceiving that Fries had incidentally done the same thing. (Voy. au Pôle Sud, p. 197.) He has likewise added various synonyms. The present is a Southern form, widely diffused, but not Antarctic.

3. Ramalina *linearis*, Ach., *Syn. p.* 294. *Swartz, Lich. Amer. p.* 14. *t.* 11. Parmelia linearis, *Ach. Meth. Lich. p.* 257. *Sprengel, Syst. Veg. v.* 4. *p.* 278. *Raoul, ut supra.*

Hab. "N. Zealand, 1769, *Sir Joseph Banks*" (*A. Cunningham*). "Crescit in ramis arborum Jamaicæ temperatioris, *et forsan quoque* N. Zelandiæ incola," *Swartz, ut supra.* "Jamaica, Nov. Zeland.," *Sprengel, ut supra.*

Swartz's figure represents a Lichen such as I have not seen from New Zealand.

Gen. IV. CETRARIA, *Ach.*

1. Cetraria *glauca*, Ach., *Syn. p.* 227. *A. Cunn. Comp. to Bot. Mag. v.* 2. *p.* 331. *Raoul, ut supra. Fl. Ant. p.* 524.

HAB. Middle Island, *D'Urville.*

I have seen no New Zealand specimens. For the geographical distribution see Dr. Hooker's remarks, Fl. Antarct. p. 523, and my own in Seemann's Bot. of the Herald, p. 47.

2. Cetraria *sæpincola*, Ach., *Syn. p.* 226. *Fl. Ant. p.* 524.

HAB. Fragments of this species occur on a specimen of *Sticta crocata*, gathered on wood at Auckland by Dr. Sinclair. Rather a large form; barren; not pulverulent.

I do not well understand how this species differs from the olive form of *C. glauca*, unless it be in the paler under surface. See Fries (Lich. Eur. p. 39). The present specimens are pale below, but blotched (through age?) with black. Found in Central and Northern Europe ("Switzerland to Lapland," *Schærer*), in the higher and Arctic latitudes of North America, also in the Straits of Magellan (Montagne).

3. Cetraria *aculeata*, Fries, *Lich. Eur. p.* 35. *Fl. Ant. p.* 524. Cornicularia, *Ach.*, *A. Cunningham, ut supra.*

HAB. Middle Island, *D'Urville.*

I have seen no specimens. States of *Cladonia aggregata* are very easily mistaken for it; but there is no reason why it should not occur in New Zealand, being found in various places in the Antarctic regions, as well as over Central and Northern Europe and Arctic America. *Cetraria lacera*, Tayl.! Lond. Journ. Bot. *ut supra*, is only a state of young *Sticta filicina*, bearing cephalodia: cyphellæ are present.

Gen. V. PELTIGERA, *Hoffm.*, *Fries.* Peltidea, *Ach.*

1. Peltigera *polydactyla*, Hoffm., *Fries, Lich. Eur. p.* 46.

HAB. Middle Island, *Raoul, Lyall.* "Very abundant in New Zealand" (*Fl. Antarct. p.* 524).

2. Peltigera *canina*, var. *pusilla*, Fries, *Lich. Eur. p.* 45. *Fl. Ant. p.* 524. P. spuria, *Ach. Meth. Lich. p.* 283. *t.* 5. *f.* 2.

HAB. Northern and Middle Islands, *Colenso, Raoul.*

Specimens small, well-marked.

3. Peltigera *rufescens?*, Hoffm., *Fries, Lich. Eur. p.* 46.

HAB. Northern Island, *Colenso.*

Mr. Colenso's specimen appears to belong to this species; it is full of apothecia, but does not exhibit the thallus very distinctly. It is probable that this and both the two preceding may be found in the temperate and alpine regions of both hemispheres, in all latitudes, but they seem to be more rare within the tropics. See Hook. Fl. Antarct. p. 524–5. Seemann's Bot. of Herald, p. 48. Linnæa, 1843, p. 15, etc.—Very probably other species of this genus will be found in New Zealand.

Gen. VI. NEPHROMA, *Ach.*

1. Nephroma *australe*, A. Rich., *Fl. Nov. Zel. p.* 31. *Voy. de l'Astrol. pl.* 9. *f.* 2. *Mont.! Fl. Fernand. n.* 66.

HAB. Northern and Middle Islands, *D'Urville, Colenso, Lyall.*

A small species, and well marked, with the habit of *N. resupinatum*, but having the colour of *N. polare* above, with the under side smooth and pale. Found also in Juan Fernandez and Tasmania.

2. Nephroma *resupinatum*, Ach., *Syn. p.* 241 (a typo recedit planta Zelandica, ad var. *papyraceam*, Ach., accedens).

Var. *rufa*, Bab.; thallo tenuissime membranaceo glabro rufo-fusco isidiophoro (non pulverulento), subtus nudo nigricante, apotheciis nigricantibus margine angusto serrato.

HAB. Northern and Middle Islands, *Colenso*, *Lyall*.

Possibly a distinct species, but I scarcely venture to separate it. More rufous and more membranaceous than *N. parile*, Ach. (Moug. et Nest.! n. 838), which Fries unites with his var. *papyracea*; it is moreover not sorediated, but isidiophorous, with subsquamulose processes. Medullary stratum white. Dr. Montagne describes the following variety, found in New Zealand, which I have not seen:—

"Var. *pruinosa*, Mont.; thallo olivaceo-fusco subtus ad ambitum rubescente, lobulis fertilibus brevibus revolutis, lamina pruina alba suffusa. An species propria?" *Mont. Pôle Sud, p.* 192.

This polymorphous Lichen is found over all Europe (Fries), and in Northern and Arctic America. *N. lævigata*, Ach., which Fries refers to this species, is mentioned as a plant of the Canary Islands by Dr. Montagne. The allied species *N. Lusitanicum*, Schær., which has the medullary stratum yellow, is also probably common, but I am sceptical as to its distinctness. I have gathered it in Scotland, and have specimens from France and Madeira. *N. cellulosum*, Ach., abounds in Tasmania, and may probably occur in New Zealand.

3. Nephroma *Lyallii*, Bab.; thallo laciniato lobato tenui membranaceo supra glaberrimo nitido lævi glauco-cærulescente in ambitu *lætissime azureo* versus centrum subrubescente, subtus nudo pallido versus centrum fuscescente lobis elongatis laciniatis crenatis et dissectis, lobis fertilibus sinuatis paullulum longioribus, strato medullari albo, apotheciorum disco pallide rubro, margine late denticulato. (TAB. CXXVII. A.)

HAB. Northern Island, *Colenso*. Middle Island, on bark, *Lyall*.

A very handsome plant, of which I have seen only one large specimen, about six inches long, composed of several suborbicular individuals. Apart from its brilliant colour, this Lichen differs from *N. resupinatum* in being far more lobed and dissected, with the margins very minutely crisped, and in its longer, fertile lobes. The thallus, also, is not at all rugose; even the back of the apothecia has but very faint wrinkles. Further observation must show whether this Lichen be really distinct, or merely (as I strongly suspect) a splendid form of the foregoing; I have a specimen from the Pyrenees of *N. resupinatum*, var. *parilis*, gathered by Mr. Spruce, of a bluish colour, but not clearly indicating a transition. Since the above was written, a mere fragment from Mr. Colenso has come to hand, evidently belonging to the present species.—PLATE CXXVII. A. Fig. 1, specimen, *natural size;* 2, portion of apothecium; 3, asci; 4, sporidia:—*all magnified.*

Gen. VII. COCCOCARPIA, *Pers.*

"*Thallus* membranaceus, subgelatinosus, orbicularis, e squamis flabelliformibus centro concretis subtus aveniis aut laciniis linearibus multifidis radiantibus constans, supra plumbeus aut viridis, subtus ad fixuras dense tomentosus. *Apothecia* scutiformia, plano-convexa, interdum symphycarpea, idiogena (i.e. thallo non marginata nec excipulo instructa). *Lamina proligera* strato medullari primitus inclusa, demum erumpens, ex ascis clavatis sporidia quaterna octonave glauco-viridia elliptico-cymbiformia bilocularia foventibus, paraphysibusque crassis geniculato-subarticulatis composita."—*Mont. Pôle Sud, p.* 178.

A very natural genus, but of doubtful affinity, not a species of which was known to Acharius. It was first described by Persoon, in Freyc. Voy. p. 206 (Presl, Repert. Bot. p. 95). Hooker, Eschweiler, and others, described one species (*Coccocarpia molybdæa*, Pers.) as a *Lecidea* (*L. parmelioides*, Hook.! in Kunth Syn. Pl. Æq. vol. i. p. 15; *L. melanothrix*, Eschw. in Mart. Fl. Brasil. p. 258). Fée and Taylor included another in *Solorina* (see below), the former botanist having first placed it in *Circinaria*. Delise, in fine, referred the species partly to *Parmelia*, partly to *Collema* (Presl, ut supra). The habit is quite that of *Parmelia plumbea*, Ach., and it seems to be as much allied in structure to *Solorina* as to anything else; but in the latter genus the lamina is imposed on the gonimical stratum

(see the excellent and learned remarks of Dr. Montagne in the Annales des Sciences Nat. vol. xvi. ser. ii. p. 123 sqq.).—The species of the genus are found in the Canaries, the East and West Indies, throughout a great part of South America, the Moluccas, Philippines, and the Ladrone Islands.

1. Coccocarpia *smaragdina,* Pers. *Mont.! Ann. des Sc. ut supra. Pers. in Freyc. Voy. p.* 206. *Presl, Repert. p.* 96. Solorina vitellina, *Fée, Essai, p.* 133. *t.* 30. *f.* 1 (in icone cit. S. cinchonarum). S. aurantiaca, *Tayl.! Lond. Journ. Bot. ut supra.*—(Tab. CXXIX. D.)

Hab. Northern Island, *Colenso, J. D. H.*

If Fée's figure belongs to this species, it represents a discoloured state different to anything that I have seen. Specimens agreeing with the New Zealand form have been collected by Mr. Spruce at Pará, and named by Dr. Montagne *C. smaragdina*, Pers. *Solorina maculata*, Tayl.! in Herb. Hook., from the West Indies and the Philippines, appears to be a form of this species.—Plate CXXIX. D. Fig. 1, plants, *natural size;* 2, portion of thallus, showing apothecium and under surface; 3, vertical section of apothecium and thallus; 4, asci and imperfect spores:—*all magnified.*

2. Coccocarpia? *pulchella,* Bab. Endocarpon pulchellum, *Ach. et Auctt.* Lenormandia jungermanniæ, *Desmaz. Pl. Crypt. Franc.*

Hab. Northern Island, *J. D. H.*

Dr. Nylander's remark (Œssai d'une Nouv. Class. des Lichens in Mém. Soc. Sc. Nat. Cherb. vol. ii. p. 15), that this perhaps belongs to *Coccocarpia*, appears to us extremely just, and I have accordingly assigned it, with a mark of doubt, to that genus. True apothecia unknown.

Gen. VIII. STICTA, *Ach.*

A large genus, principally inhabiting the southern hemisphere. The Lichens which compose it are among the handsomest, and at the same time the most difficult and variable plants of the Order, and their study is especially commended to the colonial botanist. I have endeavoured to revise the characters, but am much dissatisfied with my efforts. Delise attempted a monograph of this genus, but his materials were quite insufficient; his figures also are oftentimes very indifferent.

§ A. *Cyphellæ punctiform, bright golden-yellow.* (Chrysosticta, *Bab.*) [The species of this section are nearly allied, and very difficult to be defined by characters, which are more or less variable in all the Lichens which compose it: they principally inhabit the southern hemisphere.]

a. *Medullary stratum yellow.*

1. Sticta *aurata,* Ach. et Auctt.; thallo subcoriaceo lobato glaucescente passim lateritio rutilante lobis sinuatis rotundatis *non scrobiculatis* marginibus (sterilibus) aurato-marginatis s. pulverulento-aureis, subtus plus minus tomentoso ad centrum nigricante, apotheciis extus plus minus pubescentibus *marginalibus* disco atro-purpureo planiusculo, margine (perfecto) lato citrino vel inflexo et obsoleto.—*Eschw. Ic. Sel. Crypt. Bras. t.* 14 *opt.*

Hab. New Zealand, *all travellers.* Found fertile in Auckland by Dr. Sinclair.

S. angustata of Delise (Stict. pp. 52, 598. t. 3. f. 7), from New Zealand, is not even a variety, being only a form with rather longer lobes; the black processes mentioned by him occur on both sides of the thallus in specimens from Colenso and Sinclair; they appear to be accidental, and to result from age and decay. The *S. aurata* is subject to considerable variation, even in its apothecia, which are sometimes almost smooth, sometimes a little hairy, but it is usually known by its bright brick-red colour and pulverulent golden margins; *the thallus is not pitted* in the manner of the following species. It ranges from the equator to about 50° of latitude, north and south, fructifying principally within the tropics. I have seen specimens from Cornwall (Mr. Eagle), the Channel Islands, France, Corsica, Canary Islands, St. Helena, the Cape, Van Diemen's Land, Brazil, and the West Indies. It has also been found in

Spain, the Mauritius, Bourbon, Madagascar, the equinoctial regions of America, Texas, and the Southern States of North America, in Juan Fernandez, and the East Indies, and doubtless in many other places. It appears to affect mountain woods at a low elevation (1500 feet in the Brazils), and, according to Delise, is partial to a maritime situation. Martius, however, has found it in a very inland locality at Arara-Coara (province of Rio Negro).

2. Sticta *orygmæa*, Ach.! *Meth. Lich. p.* 278; thallo amplo *membranaceo* (fere papyraceo) rigidulo patulo viridi-glauco *passim violaceo-purpurascente* in ambitu lobato, profunde per totam superficiem *et præsertim ad centrum scrobiculato* et reticulato, subtus læte flavo subnudo *bullato* in interstitiis obscuriore ibique breviter tomentoso, lobis amplis rotundatis marginibus obtuse crenatis sublobatis, ramulis isidioideis *glaucis*, apotheciis undique numerosissimis *appressis parvis*, extus *glaberrimis lævibus* disco atro-purpureo (sicco nigro) concavo demum *turgido convexo*, margine tenui *distincto* crenato demum evanescente.—Sticta orygmæa, *Mont., Voy. au Pôle Sud, p.* 190. *pl.* 15. *fig.* 1 *opt. Hook. fil. Fl. Antarct. p.* 197 *et p.* 526.

Var. *b. rigido;* thallo rigido cartilagineo.

Hab. Common throughout the Islands, on wood and sticks, *Menzies and all travellers.*

There is some little doubt about the synonym of Acharius, as Dr. Montagne and Dr. Hooker have observed, *ll. cc.;* he may probably have included under it the *S. D'Urvillei*, Delise. In Sir W. J. Hooker's herbarium are two specimens of "*S. orygmæa*, Ach., N. Zealand," fixed on the same paper, from Menzies, who supplied Acharius with specimens. One of these belongs to *S. D'Urvillei* (*L. ochraceus*, Menzies!) clearly; the other I suppose to be a fragment of the present species; the thallus, however, is thicker than ordinary, and the colour more inclined to be rufescent, thus approaching *S. Colensoi;* in other respects it agrees. Delise's figure (pl. i. f. 3) is made from small fragments; the corner figure appears to belong to the true plant; the execution of the other two fragments is so indifferent that I can give no opinion on them.—Thallus a foot wide in a specimen from Colenso, about 3 or 4 inches in the Antarctic specimens, nearly orbicular, running over trees and sticks, glaucous above, becoming darker and greener when moist (usually without any tendency to a rutilant or rufescent hue), very much scrobiculated when in maturity, especially towards the middle, so that the *whole thallus* appears reticulated and pitted. Here and there the surface (especially after being wetted) has a delicate purple-violet tint, by which character the species may usually be recognized. In some specimens from Auckland Island, as well as from New Zealand, portions of the upper surface have a pallid brick-colour, and I suspect that this state is the *S. Feei*, Delise, and that the habitat (North America) is erroneous. Difficult as it is to lay down absolute characters, it may be said of this species that its colour is more glaucous, its texture more membranaceous, its lobes less divided, its under side brighter and more bullated, than in *S. aurata, D'Urvillei*, or *Colensoi*. The apothecia also are darker than in *S. Colensoi*, and far more numerous and smaller than in any of the three species. The certain habitats for this species are New Zealand, Auckland Islands, and the Straits of Magellan.

3. Sticta *Colensoi*, Bab.; thallo amplo patulo crasso rigido lobato luteo-glaucescente versus margines *plus minus sordide rufescente* profunde et grosse scrobiculato ad margines iterum clathrato et reticulato, lobis suboblongis profunde sinuatis et dissectis marginibus undulatis, ramulis isidioideis *sordide luteis*, subtus nudiusculo flavido passim tomentoso et obscuriore vix bullato, cyphellis prominulis flavis, apotheciis sparsis *magnis liberis* extus plus minus *rugosis*, margine *indistincto* rugoso subcrenato evanido disco vinoso *rubro* valde concavo demum explanato lacerato.

Var. *b. pinnatifida;* thallo magis glauco minus rufo ad marginem tantum et minus profunde scrobiculato, granulis isidioideis subnullis, apotheciis extus sublævibus. (Tab. CXXIII.)

Hab. Northern and Middle Islands, *Colenso, J. D. H., Raoul, Lyall.*

A perplexing and variable species, but I do not see to what other it can be safely united: its nearest ally is perhaps *S. orygmæa* (Raoul's specimen is named *S. orygmæa*), but in *S. Colensoi* the thallus is usually thicker, less minutely scrobiculated, more divided, and differently coloured; the beautiful violet tint is wanting, though in decay

the plant is sometimes obscurely blotched with purple; the under side is less brightly-coloured and more even; coral-like processes *yellowish* (rising from the gonimical stratum). The apothecia, however, perhaps afford the best marks, as above indicated; disc $\frac{1}{8}$–$\frac{1}{6}$ of an inch broad, or even more. Of the more rufous, more scrobiculated, and less divided form, I have seen but indifferent specimens from New Zealand; better examples abound in the beech-forests of Tasmania. We add a figure of our *b. pinnatifida,* from a beautiful specimen of Mr. Colenso.—PLATE CXXIII. Fig. 1 and 2, specimens, *natural size;* 3, portion of the apothecium; 4, asci; 5, sporidia:—*all magnified.*

4. Sticta *D'Urvillei,* Delise! *Stict. p.* 599. *c. icon. in fin. oper.;* thallo crasso molliusculo amplo patulo lobato glaucescente livido et passim *nitide rutilante-ochraceo* præcipue ad margines scrobiculato et reticulato, lobis divisis subflabellatis dissectis crispatis, subtus murino passim fulvescente nudo vel pallescente-tomentoso, cyphellis sæpius confluentibus majusculis, ramulis isidioideis (ubi adsunt) rutilante-ochraceis *in pulvinulos sæpe densissime stipatis;* apotheciis sparsis primitus extus *tuberculatis* postremo glabriusculis liberis majusculis, disco primitus rubro deinde *purpureo-nigro* inæquabili subconcavo, margine inflexo undulato persistente.—S. endochrysa, *Hook. fil. Fl. Ant. p.* 525. *pr. p. t.* 195. *f.* 2.

HAB. Northern and Middle Islands, *Menzies, Colenso, etc.*

Very near the preceding, and perhaps not distinct from it; and yet, after examining a considerable number of specimens of this and the two preceding species, I have seldom found much difficulty in knowing to which I should refer them; the study of these intricate plants, however, must be left to colonial botanists. The pulvinate coralline excrescences, the agreeable ochraceous hue, and especially the apothecia, distinguish *S. D'Urvillei* from its congeners. "*L. ochraceus,* Menzies," without habitat, is the name attached to specimens in Sir W. J. Hooker's herbarium, and in Aiton's (now my own). *S. D'Urvillei* occurs also in Chiloe, the Falklands, and Cape Horn. Dr. Hooker (with whose views Dr. Montagne accords doubtfully in a MS. note in Herb. Hook.) unites *S. endochrysa,* Del.! with *S. D'Urvillei,* Del.!; but the former plant has the *adult* medullary stratum almost white, whereas in *S. D'Urvillei* it is, in every stage, of a full chrome-yellow; there are, besides, other differences. I have not seen specimens from New Zealand.

b. *Medullary stratum white in an adult state* (the stratum towards the margins is slightly tinged with yellow).

5. Sticta *crocata,* Ach., *Meth. Lich. p.* 277; thallo subcartilagineo sublacunoso reticulato laciniato, lobis plus minus laceris *subrotundatis,* subtus lanuginoso obscuro, sorediis pulverulentis subrotundis confluentibus viridi-flavis (aliquando desunt), cyphellis minimis citrinis, apotheciis submarginalibus extus subtomentosis disco opaco nigro margine thallode tenuissimo (etiam foliaceo!) crenato deinde integro evanescente.—*E. Bot. t.* 2110 (*bon.*).

HAB. Northern and Middle Islands, *Colenso, Sinclair, Raoul* (Herb. Mus. Paris, n. 62), *Lyall;* running over sticks, etc. Fertile.

A very variable plant, but in general readily recognized: perhaps some of Delise's species may be forms of this. Fries (Lich. Europ.) says that the European plant cannot safely be distinguished from *S. aurata,* but that extra-European specimens are manifestly different. The European (at least the Scotch) plant agrees exactly with that from New Zealand, and Delise says that Hooker's Scotch specimens are identical with those from the Sandwich Islands. If this species cannot be distinguished from *S. aurata,* we must combine all the golden-cyphelled *Stictæ* together, for no two are more distinct. In some European and New Zealand specimens the thallus is almost or (in Sinclair's very fertile specimens) quite naked, in others nearly covered with green-yellow soredia. Cyphellæ sometimes almost obsolete.—The geographical range of this species is wide; it occurs in England, Ireland, Scotland, France, Spain, the Canary Islands, Bourbon, Australia, Tasmania, Straits of Magellan, Falklands, Cape Horn, west coast of South America, West Indies, Sandwich Islands, and the United States, and, if *S. gilva* be the same, at the Cape of Good Hope. This gives us as the range about 56° or 57° north and south. Dr. Hooker (Fl. Ant.) names Inverary as its northern limit, but I have gathered it at Arisaig, and also at Oban, both on the west coast

of Scotland, in lat. 57° north. It is less rare in Britain than has been supposed, and appears to be more common in temperate than in tropical regions.

6. Sticta *carpoloma,* Delise, *Stict. p.* 159. *c. icon. in fin. oper. non color.*; "thallo cartilagineo coriaceo, lobis laciniatis elongatis *subcorniculatis* retuso-truncatis, supra lacunoso pallido flavescente (s. rufescente), subtus tomentoso (vel nudo) ochroleuco, cyphellis citrinis punctiformibus, apotheciis *marginalibus* (et sparsis) disco concavulo brunneo-nigricante margine prominulo subevanescente."—*Delise.* S. impressa, *Tayl.! pr. p. in Hook. Lond. Journ. ut supra.* (Tab. CXXVI.)

Hab. Astrolabe Harbour, Middle Island, *D'Urville.* Northern Island, *Colenso, J. D. H.* Great Barrière Island (on wood), *Sinclair.*

Allied to the preceding, but having exactly the habit of the *S. foveolata,* Del., from which it can scarcely be distinguished when the cyphellæ are obsolete. The broader forms are not altogether unlike *S. pulmonacea,* as Delise observes. In spite of a certain amount of variation in the length and breadth of the segments of the thallus, and of the more or less tomentose or quite naked under side, *S. carpoloma* is in general easily recognized by its deeply lacunose and forked lobes: the apothecia and medullary stratum agree with *S. crocata.* In the Hookerian Herbarium is a fragment sent by Dr. Montagne, who has compared Delise's plant, which was collected in Chili, the only other station for our Lichen, so far as we know. This plant does not bear soredia or coralline processes.—Plate CXXVI. Fig. 1, portion of specimen, *natural size;* 2 and 3, upper and under surfaces of lobes of the frond; 4, vertical section of apothecium and thallus; 5 and 6, asci; 7, sporidia:—*all magnified.*

7. Sticta *Mougeotiana,* Delise, *Stict. p.* 62. *t.* 5. *f.* 13; "thallo cartilagineo laciniato lævi, lobis elongatis multifidis, lobulis rotundato-crenatis marginibus erosis flexuosis inflexis, supra glauco-hepatico pulvinulis fruticulosis auratis in marginibus tecto, subtus rugoso vix tomentoso ad centrum nigricante in ambitu brunneo-pallido, cyphellis minutis citrinis, apotheciis . . . ?" *Delise, l. c.—A. Cunn. Comp. Bot. Magaz. v.* 2. *p.* 331.

Hab. Middle Island, *D'Urville.*

Dr. Montagne describes the apothecia as "marginalia, subsessilia, disco fusco-badio plano, margine decorticato purpurascente" (Fl. Fernand. n. 73). He inclines to unite *S. aurigera,* Del., to this species. I am sorry not to have an authentic specimen of this Lichen; the colour of the medullary stratum is not noticed by the authors mentioned. Mr. Colenso has collected what is probably the same plant: if so, it is white.

§ 2. *Cyphellæ white or pale yellow; either punctiform, or explanate, or urceolate.* (Leucosticta, *Bab.*) [Species of this section are found in almost all parts of the world, but by far the greater part occur in the temperate and frigid regions of the south. No Lichens present greater difficulties as to the limitation of species than this group.]

A. Stipitatæ, Bab.—*Thallus contracted at the base into a thick, distinct, woody stem; frond flabellate, more or less distinctly costate. Apothecia not hairy.*

8. Sticta *filicina,* Ach., *Meth. Lich. p.* 276.—*Hoffm. Pl. Lich. t.* 55 (*opt.*).

Hab. Northern and Middle Islands, on rotten wood, *Forster, Menzies, etc.*

Hoffmann's figure is so excellent, that little need be said of this species; the elongated stipes, the decompound and dissected, and very strongly costate, thallus, the elegantly coloured, ferruginous, minutely tomentose under side, and minute urceolated cyphellæ, distinguish it readily from every Lichen with which I am acquainted. Dr. Montagne, in his valuable account of the Lichens of the Canary Islands (p. 106 in Webb and Berthelot's Hist. Can.), thinks *S. Dufourii* the same as *S. filicina.* I am indebted to his kindness for a French specimen of the former plant, which seems to me altogether a different Lichen, though belonging to the present Section; its ally is rather *S. fuliginosa,* with which it accords in most respects, except in the more or less distinct, elongated, woody stipes, and costate thallus. Dr. Hooker's *S. filicina!* from Cape Horn (Fl. Antarct. p. 528), clearly appears to belong to *S.*

Dufourii. I may just add that *S. Dufourii* occurs in the Hookerian Herbarium, marked "Scotland," to which Dr. Taylor has written the name *S. fimbriata*, Tayl. *S. filicina* occasionally bears black cephalodia, which greatly resemble the apothecia of a *Cetraria;* we have added a figure of this state. The young plant bearing these has been called *Cetraria lacera* by Dr. Taylor (in Hook. Lond. Journ. Bot. Dec. 1844). The branches in this species occasionally take root and form another plant. We have seen no specimens of true *S. filicina* except from New Zealand; it is said to be found elsewhere, among other places, in Jamaica; but we rather suspect that this may be our *Sticta Seemanni*, of which a figure will soon be published in the 'Botany of the Herald,' and to which *S. marginifera*, Mont.! (barren), may possibly be referred.†

9. Sticta *latifrons*, A. Rich! *Fl. N. Zel. p.* 27. *t.* 8. *f.* 2; stipite lignoso crasso brevi, thallo coriaceo glaucescente flabellato sinuato lobis linearibus palmatis corniculatis integerrimis subtus glabriusculo s. breviter tomentoso plus minus obscuriore subreticulatim costato, cyphellis amplis lutescentibus expansis, apotheciis rubris (pallidis s. obscuris) appressis planis demum convexis, margine tenui evanescente.

Var. *α. ochroleuca*, Bab.; thallo ochroleuco s. glauco, costis validioribus, subtus pallido, apotheciis flavo-rubris.

Var. *β. Menziesii;* thallo crassiore flavo-fusco subtus brunneo nigricante costis obscurioribus, apotheciis fusco-rubris s. nigricantibus.—S. Menziesii, *Hook. fil.! Fl. Antarct. p.* 198. (Tab. CXXII.)

Hab. Northern and Middle Islands, on trees, earth, and stones, *Menzies, De Belligny* (Herb. Mus. Par. n. 57), *Colenso, etc.*

A well marked species, but varying in colour, and in the length of the stem, which is sometimes almost obsolete. It is possible to select specimens of *α* and *β* which look very different, but an inspection of a numerous suite will convince any one that there are no limits whatever between them. *S. macrophylla* varies exactly in the same way, and its dark form is called *S. badia* by Mougeot.—Found also (as it appears) in Lord Auckland's Group and in Owyhee, but the specimens in Herb. Hook. are incomplete.—Plate CXXII. Var. *Menziesii*. Fig. 1, young state; 2, old state, *natural size;* 3, vertical section of under surface of thallus; 4, section of apothecium; 5, ascus; 6, sporidia; 7, portion of subjacent stratum:—*all highly magnified.*

B. Damæcornes, Bab.—*Thallus stemless; lobes repeatedly forked and corniculated, nearly linear, margins not sinuated and dissected. Apothecia not hairy.* [The species of this section are so nearly allied, that it is next to impossible to limit them. See J. D. Hook. Fl. Ant. p. 527. The species of Delise's work, n. 29–40, appertain for the most part to this division, which forms in itself a tolerably natural section, but merging into the preceding and following one.]

* *Thallo profunde scrobiculato.*

10. Sticta *Richardi*, Mont.! *ut infra;* thallo subcoriaceo s. submembranaceo *molliusculo opaco* dichotome laciniato, laciniis elongatis divergenti-corniculatis, apicibus loborum acutis s. rotundatis s. emarginato-truncatis supra *pallido* glaucescente vel viridi rufescente *subconcentrice* scrobiculato, subtus plus minus

† Since the greater part of this account of the New Zealand Lichens was written, I have received from Dr. Montagne his diagnosis of new species of Lichens in Chili, and remarks on other described plants of the same Order (Ann. des Sc. Nat. ser. iii. vol. xviii.). He remarks of *S. filicina* that it would take a volume to describe its forms, and unites with it *Sticta Dufourii*, Del., *S. marginifera*, Mont., *S. hypopsila*, Mont. (which he considers probably the same as *S. glaberrima*, Laur., remarking "transitus ad *S. damæcornem*"), and *S. latifrons*, A. Rich. The specimens which I have seen would not have led to the same conclusion as my learned friend has arrived at, but I do not at all deny the possibility of his views being right, and commend them to the attention of the colonial student. Still I have, on the whole, preferred to let the above remarks stand as they were originally written, acknowledging at the same time that they probably require modification. The liability to error is in cases of this kind very great, and no one, who is only acquainted with a few dried specimens, ought to lay too much stress on his own views.

breviter tomentoso subochroleuco bullato *versus ambitum subnudo pallido vel albido,* cyphellis minimis *niveis,* apotheciis *semper marginalibus,* disco (semper ?) nudo.

Var. *α. glauca,* Bab.; thallo molli glauco pallido subtus versus ambitum subnudo albido, apotheciorum disco subrubro.—Sticta impressa, *Tayl.! pr. p. ut supra.*

Var. *β. rufovirescens,* Bab.; thallo rigidiusculo rufo-virescente subtus obscuriore versus ambitum fulvo, apotheciorum disco nigrescente.—*A. Rich. Astrol. t.* 9. *f.* 1. S. Richardi, *Mont.! Fl. Fernand. n.* 79. *Voy. au Pôle Sud, p.* 187. S. carpoloma, *A. Rich. ut supra* (*non Delise*).

Hab. Northern and Middle Islands, abundant, *D'Urville, Cunningham, Hombron, Lyall, etc.*

This form is in general easily distinguished from the following by certain relative characters, such as a softer, more opaque, and paler thallus, more naked and paler under side, also by the *strictly marginal* apothecia, whose disc we have never seen pruinose, and by the invariably (?) snowy cyphellæ; but when the plant assumes the form well represented by M. Richard (our var. *β*), it becomes less easy to separate it from *S. foveolata γ*, and we have seen a Tasmanian specimen or two so ambiguous that we fear the plants may possibly pass into each other, as Dr. Hooker has also strongly suspected. Dr. Montagne calls the margins "corrugato-ascendent:" the same remark may often be made of the following species. Found also in Juan Fernandez, Auckland Island, and Tasmania.

11. Sticta *foveolata,* Delise, *Stict. p.* 101. *t.* 8. *f.* 36 (*bon.*); thallo cartilagineo *rigido nitido* lobis subcorniculatis, supra *obscuro olivaceo s. viridi-brunneo reticulato-foveolato,* subtus plus minus tomentoso subobscuro non aut vix bullato, cyphellis subclausis minimis albidis s. lutescentibus, apotheciis marginalibus *et disco frondis sparsis,* disco primitus sæpe pruinoso demum nigro.

Var. *α. Flotowiana,* Bab.; thallo crasso ad centrum diviso, lobis latiusculis divisis segmentis sublinearibus profundissime scrobiculatis, subtus obscuro nigricante tomentoso, cyphellis albidis s. flavidis, apotheciis numerosissimis marginalibus et interdum sparsis.—S. foveolata, *Delise, l. c. Mont.! Voy. au Pôle Sud, p.* 186. *Hook. fil.! Fl. Antarct. p.* 197. S. Flotowiana, *Laur. in Linn.* 1827. *p.* 40. S. impressa, *Tayl.! pr. p. ut supra.* S. linearis *ejusd.!*

Var. *β. cellulifera,* Bab.; thallo stellato crassissimo vix usque ad centrum diviso, lobis latissimis (uncialibus et ultra) profundissime reticulato-scrobiculatis parum profunde divisis segmentis latiusculis brevibus subpalmatis, subtus reticulato ad centrum nigricante, cyphellis albidis s. flavidis, apotheciis per totum thallum dispersis et marginalibus.—S. cellulifera, *Tayl.! pr. p. ut supra. Hook. fil.! Fl. Antarct. p.* 198. (Tab. CXXIV.)

Var. *γ. Billardieri,* Bab.; thalli laciniis angustioribus longioribus politis glauco-fuscescentibus minus crassis minus profunde scrobiculatis, subtus versus ambitum sæpius fulvis, cyphellis plumbeis s. albo-flavidis sæpe clausis obsoletis, apotheciis submarginalibus.—S. Billardieri, *Del. Stict. p.* 99. *t.* 8. *f.* 35. *Hook. fil.! Fl. Antarct. p.* 527.

Hab. Northern and Middle Islands, common, *Cunningham, Lyall, etc.*

The Lichens comprehended in the above-cited synonyms have occasioned much trouble to Dr. Hooker and myself. I cannot discover any limits to the varieties above mentioned; the cyphellæ vary considerably in colour, and the upper and under surfaces of the frond still more so. In all the forms of this species the scrobiculations are more irregular, the consistence thicker, the thallus more polished and darker, than in the preceding; in *α* and *β* the scrobiculations are very deep, and the thallus in all appears intersected by anastomosing lines, which are often punctulated; the apothecia also (usually very numerous) are freely scattered over the frond. In *γ* the reticulations are less profound, the segments narrower and less thick, often denticulated at the margin, the under side somewhat paler, and the apothecia are more confined to the margin; the colour, however, of both sides of the frond is variable. In all, the disc of the young fruit is often pruinose. Var. *β* has very much the habit of *S. pulmonacea,* and hardly differs from *S. anthraspis,* Ach.! from California (*Herb. Sm.*), except that in the latter the segments are hardly at

all corniculate (the habit being exactly that of *S. linita*, Ach., see Delise's figure), and the consistence is much thinner. Laurer's synonym may be regarded as tolerably certain; the description agrees, and a specimen of the plant collected by Sieber (named *S. damæcornis*), whose Lichens Laurer describes, is found in the Hookerian Herbarium. The various forms of this species occur commonly in the subtropical, temperate, and frigid regions of Australia, South America, and their outlying islands. I strongly suspect that Menzies' specimens of *S. anthraspis* came from New Zealand, and not from North America. If it were worth while, twice as many varieties might be enumerated, and very probably several species of Delise and Laurer should be added to the synonyms.—PLATE CXXIV. Var. *cellulifera*. Fig. 1, plant, *natural size;* 2, under surface of thallus, showing cyphellæ; 3, vertical section of apothecium; 4, highly magnified section of ditto; 5, asci; 6, sporidia :—*all highly magnified.*

** *Thallo non scrobiculato.*

12. Sticta *fragillima,* Bab.; thallo glaucescente flavido passim rufescente membranaceo *fragillimo* canaliculato dichotome ramoso, lobis linearibus furcatis sæpius tuberculatis, subtus *costato* brevissime fusco-tomentoso, cyphellis niveis, apotheciis marginalibus et sparsis parvis disco rufo plano margine tenuissimo evanescente.

Var. *β. glaberrima,* Bab.; thallo subcinnamomeo, lobis latioribus sinuatis subtus saturatius tinctis subcostatis glaberrimis aut glabriusculis, cyphellis urceolatis, apotheciis . . . .—S. glaberrima, *Laur.! in Linn.* 1827. *p.* 42.

HAB. Northern Island, *Dieffenbach, J. D. H.* Branches of decayed trees, Kaipara forests, *Mossman! n.* 736.

Very similar to *S. damæcornis* in its ramification, and, like it, prone to considerable variation, as is apparent from the few specimens which I have examined. The consistency of the thallus, however, is widely different, and is so extremely brittle that most of the specimens are more or less mutilated. The central costa being more or less distinct, is likewise a character of importance. The var. β cannot be satisfactorily separated; the lobes are broader and shorter, and the colour is different; the under side likewise is sometimes, but not always, quite smooth. *S. damæcornis*, var. *rufa*, Bab. *in Seemann's Bot. of the Herald. ined.* (*S. rufa*, Auctt.) is an analogous form of *S. damæcornis.* I am indebted to Dr. Fenzl, of Vienna, for a minute specimen of *S. glaberrima*, Laur.! which (when compared with the description) I have no doubt in referring hither. Laurer gives the Mauritius as the habitat, but my specimen is marked as from New Holland. In all likelihood *S. cinnamomea*, A. Rich. *Fl. de la N. Zél. p.* 28. *pl.* 8, *f.* 3. is a fine state of this form. It does not seem, however, to be costate; the apothecia are represented as very dark, and having a tolerably broad margin. I have seen no authentic specimens.

13. Sticta *cinnamomea*, A. Rich.; "thallo cartilagineo, expanso, irregulariter diffuso et profunde lobato; lobis dilatatis apice marginibusque incisis, lobulis integris aut emarginatis subimbricatis; supra glaberrimo, lucenti; brunneo-flavescenti, subcinnamomeo, subtus, præsertim ad basin divisionum, obscuriori, tomentello, cyphellis albis minimis consperso; apotheciis paucioribus submarginalibus, planiusculis nigrescentibus marginatis, margine crenulato discolori." *Fl. Nov. Zel. p.* 28. *t.* 8. *f.* 3.

HAB. Middle Island: Astrolabe Harbour, *D'Urville.*

See remarks under the preceding species.

14. Sticta *damæcornis*, Ach.! et Auctt.—A typo paullulum differt var. *macrophylla,* Bab. *in Seemann's Bot. of Herald, sub prelo;* thallo latiore crassiore, lobis subimbricatis plumbeis passim fuscescentibus apicibus rotundato sinuato-rotundatis, apotheciis marginalibus et sparsis.—S. macrophylla, *Delise, Stict. p.* 110. *t.* 10. *f.* 42. *Schær. Enum. Crit. Lich. Eur. p.* 31.

HAB. New Zealand, probably from Akaroa, *Raoul* (*Herb. Mus. Paris, n.* 40).

Very poor fragments occur in Herb. Hook., but they may be referred to this form. For the distribution (which

is very wide) see my remarks in Dr. Seemann's work. It is the one species of this group occurring in Europe, and there only in Ireland and the Azores.

15. Sticta *sinuosa*, Pers.; "thallo glauco lævi subtus fuscescente profunde diviso laciniis subdiscretis sinuosis, scutellis submarginalibus dilute badiis."—*Pers. in Freyc. Voy. p.* 200. *Presl, Repert. Bot. p.* 91. *Mont.! in Hook. Lond. Journ. of Bot. v.* 4. *p.* 6.

Var. *papyracea*, Bab.; thallo humecto læte viridi tenuiore, apotheciis minoribus sparsis dilute rubris.

Hab. Northern and Middle Islands, *Colenso, Lyall.*

A troublesome form, varying a good deal in the breadth of the segments and in the colour. I am not fully convinced that it is distinct from *S. damæcornis*, from which, however, the sinuous, less corniculated ramification appears to separate it. The cyphellæ are large and explanate.

16. Sticta *variabilis*, Ach., *Lich. Univ. p.* 455; thallo cartilagineo prostrato laciniato, lobis linearibus furcatis crenulatis apicibus fissis tenuiter dissectis, supra lævi pallido glauco ochraceo in humido virescente, subtus tomentoso ad centrum fusco-nigricante in ambitu ochroleuco, cyphellis urceolatis pallidis, apotheciis submarginalibus disco fusco-rubro margine prominulo.—*Delise, Stict. p.* 119. *t.* 11. *f.* 48. *A. Rich. Flora.*

Hab. Northern and Middle Islands, on bark, *Colenso, D'Urville, Sinclair.*

Dr. Sinclair's specimen agrees well with an authentic fragment of *Sticta variabilis*, Ach., found in Bourbon by Bory, preserved in the Hookerian Herbarium, and communicated by Dr. Montagne; in Bory's specimen, however, the under side is darker, the cyphellæ are less pure white, and the lobes somewhat shorter. These differences are of very little moment, especially in a species which, as its name implies, is given to considerable variation. Bory's remark, given in Acharius (to whom it was unknown), is excellent:—"Elegans, laciniis lobatis læte virentibus, margine circumcirca delicate dissectis quasi *Jungermannia furcata*." Delise's figure is either very bad, or expresses a state of the plant very different from such as I have seen. The colour in Bory's and Sinclair's specimen is glaucous green, scarcely at all ochroleucous, as Delise describes it; the long, linear, very narrow, forked lobes contrast strikingly with the main broad divisions of the thallus; these are somewhat channelled, and show a very slight inclination to become costate. This species has some points of resemblance to *S. filicina*, as Delise very truly observes, but is sufficiently distinct. Mr. Colenso has collected a *Sticta* on *Fagus*, which I conceive to be a large and broad state of this species; the appearance of the upper side is precisely that of *S. filicina*, the margins of which are frequently much cut and dissected like *Cetraria fallax* (a fact of which Delise was ignorant), and so is that of the apothecia likewise; the colour too has a tinge of ochroleucous or rufous, but the under side is not at all or very slightly costate, quite void of the ferruginous tint peculiar to *S. filicina*, and the cyphellæ are also different. The same plant, barren and more glaucous, and with the margins exceedingly finely cut, and the segments elongated, is named by Dr. Taylor *S. chloroleuca* (ut supra); another specimen he has named *S. filicina*. Precisely the same form is found fertile (apothecia minute, rufous) in Surinam, which he has named *S. propaginea* in Hook. Lond. Journ. Bot. vol. vi. p. 178. This Lichen was discovered in Bourbon, and is also found, according to Dr. Montagne, in the Straits of Magellan, Auckland Island, and the Island of Balaou (Archip. des Viti).

C. Foliosæ, Bab.—*Frond not at all or but slightly corniculated, extremities frequently rounded; margins sinuated, often crenate, crisped and dissected. Apothecia not hairy.* [This section cannot be strictly distinguished from the foregoing; *S. sinuosa*, *S. variabilis*, and *S. Freycinetii* in some degree connect them.]

* *Cyphellæ more or less punctiform or indistinct, not definitely explanate.*

17. Sticta *Freycinetii*, Delise; thallo amplo crasso cartilagineo sinuato appresso ambitu libero, lobis plus minus elongatis sinuatis et dissectis (sæpe folia quercus referentibus) versus apicem crenulato-undulatis subcorniculatis supra lævi ochroleuco planiusculo s. sublacunoso, subtus subtomentoso fusco-cinereo in ambitu ochroleuco, cyphellis magnitudine variis prominentibus albo-plumbeis demum subexcavatis, apotheciis marginalibus et sparsis extus furfuraceis subtuberculosis elevatis *primitus profunde concavis* subclausis

demum magnis explanatis disco rufo (sæpe stellatim fisso) margine *furfuraceo acute denticulato* demum inflexo et evanescente.—S. Freycinetii, *Delise, Stict. p.* 124. *t.* 14. *f.* 51 (*mediocr.*). *Hook. fil.! Fl. Ant. p.* 528. *t.* 196 (*bon.*) (*non p.* 198.) S. fulvo-cinerea, *Mont. Voy. au Pôle Sud, p.* 184. S. Magellanica, *Fries, Syst. Orb. Veg. p.* 283. Parmelia lactucæfolia, *Pers. in Freyc. Voy. p.* 199. *Presl, Repert. Bot. p.* 91.

Var. *β. Delisea,* Bab.; thallo minore tenuiore subpapyraceo lobis longioribus subcanaliculatis colore variis (plus minus glaucis, olivaceis s. ochroleucis) *marginibus sinuatis* erosis *crenatis et* (*sæpe tenuissime*) *dissectis,* subtus tomentoso vel nudo ochroleuco vel nigricante, apotheciis minoribus submarginalibus sessilibus planiusculis, disco sæpe corrugato "papillato" (*Delise*), demum nigricante.—Delisea pseudo-sticta, *Fée, Essai, p.* ci. *t.* 2. *f.* 15. Sticta Delisea, *Delise, Stict. p.* 94. *t.* 9. *f.* 32. S. Freycinetii, *Hook. fil.! Fl. Antarct. p.* 198 (corrected to *S. Delisea*).

HAB. Northern and Middle Islands, abundant, *Colenso, Lyall, etc.*

To construct a specific character that shall include every variety of this plant is nearly impossible; the lobes vary exceedingly in shape, thickness, and colour; the under side and cyphellæ are likewise very far from uniform; the most obvious distinction, as Dr. Hooker observes, lies in the pubescent apothecia with fimbriated margins. Some specimens (of *α*) occur with the habit of *Peltidea aphthosa* (see Hooker's figure); one of Mr. Colenso's is almost precisely similar to *Sticta glomulifera;* while the smaller forms (*β*) are not unfrequently like *Cetraria glauca.* A careful consideration of a large number of specimens has convinced me that the *Sticta Freycinetii* of the two parts of the 'Flora Antarctica' are only forms of one and the same species; the *S. Freycinetii* of the first part being our var. *β Delisea,* which is probably *S. Delisea,* Del., though I have no authentic specimens, and have not seen the disc distinctly papillated, as Fée represents it; it is not unfrequently morbose and corrugated. Dr. Montagne's plant, "S. Delisea, *Fée?*" Voy. au Pôle Sud, p. 186, appears from the description to be a form of our var. *β*; and I suspect that *S. malovina,* Fries, Syst. Orb. Veg. p. 283, is not specifically different.—A very abundant species where it occurs, being found in New Holland (Delise), Port Famine, Juan Fernandez (Herb. Hook.), Tasmania, and all the Antarctic regions from the sea-level to the mountain-tops. For further remarks see Hook. Fl. Antarct. p. 198. Dr. Taylor well included all the present forms under one species, *S. glabra,* Lich. Antarct. n. 84, ut supra, but his name must be changed.

18. Sticta *granulata,* Bab.; thallo coriaceo rigido profunde laciniato irregulariter scrobiculato, lobis subcanaliculatis irregulariter divisis et laciniatis marginibus crenatis (sæpe sorediiferis) supra sordide viridi-olivaceo (humecto lætiore viridi) passim rufescente, epidermide sæpe longitudinaliter rupta demum sorediis corallineis pulvinulatis albidis squalidissimis demum fuscescentibus (sæpe densissime) obtecto, subtus tomentoso rufescente s. fuscescente ad centrum nigricante, cyphellis primitus clausis deinde subexpansis depressis albido-lutescentibus magnitudine variis irregularibus, apotheciis submarginalibus extus glaberrimis disco nigricante margine thallode tenuissimo integro evanescente.

HAB. Middle Island, *Lyall.*

This Lichen does not appear to be described, unless by chance *S. dissecta,* Laur. in Linn. 1827. p. 41, be a more elegant and pinnated form of it. It had escaped Laurer that a very different species is figured by Swartz (Lich. Amer. t. 8) under that name. Our Lichen resembles *S. pulmonacea* a good deal in its ample size and general mode of division, but seems to be as nearly allied to the preceding as to any other. The olive-green colour, the scrobiculated thallus, and, above all, the tendency of the plant to produce copious dirty coralline pulvinate soredia, often covering the centre, and the irregular, ill-developed, dirty yellow cyphellæ, are its most obvious characters. Found also in Tasmania by Gunn and by Hooker. The apothecia seem rare; we have only seen two, and these not in a very good state. The imperfectly-formed cyphellæ show a transition to the structure of the simple naked spots of *S. scrobiculata* and its allies, which constitute a section (*Lobaria*) not yet found in New Zealand.

19. Sticta *argyracea,* Delise; thallo suborbiculari subcoriaceo foliaceo profunde laciniato, lobis elon-

gatis subpinnatifidis marginibus sinuatis crenatis sæpe albo-marginatis (sorediiferis) apice repando-crenatis, supra *fusco-æneo s. viridi-rufescente* (humecto lurido-virescente) *albo-guttato,* dein sorediis prorumpentibus sparsis verrucæformibus albis s. cærulescentibus exasperato, subtus tomentoso rufescente ad centrum nigricante, cyphellis planiusculis niveis, apotheciis parvis submarginalibus planiusculis nigro-fuscis margine crenato granulato.—S. argyracea, *Delise, Stict. p.* 91. *t.* 7. *f.* 30 (*pessima*). S. aspera, *Laur. in Linn.* 1827. *p.* 41. *Mont.! in Bel. Voy. aux Ind. Or. p.* 120; *ejusd. Voy. au Pôle Sud, p.* 187.

HAB. Northern and Middle Islands, *Colenso, Lyall, etc.*

Allied to *S. sylvatica,* but readily distinguished by its albo-guttate thallus, the spots being really incipient soredia, which soon break form into minute white or bluish fibrillose warts, by which the upper surface is rendered rough. Dr. Montagne has kindly sent a fructified specimen of this widely-dispersed species from Cochin China; it occurs also in the Mauritius, Bourbon, Madagascar, Tahiti. There is little doubt that *S. aspera,* Laur., is the same as *S. argyracea,* Del. Dr. Montagne cites as a probable synonym of the former *S. exasperata,* Pers. in Herb. Mont. M. Delise gives as a synonym of the latter *S. exasperata,* Moug. in Herb.

20. Sticta *Hookeri,* Bab.; thallo submembranaceo amplo profunde laciniato scrobiculato et reticulato, laciniis adscendentibus irregulariter laceris sinuatis et crenatis subrotundatis, supra lurido glaucescente æneo-fusco (humecto nigro-viridi) in ambitu rufescente, tuberculis isidioideis fuligineis squalidis (subobsoletis) hinc inde prorumpentibus subtus tomentoso fuligineo-nigro in ambitu fuscescente, cyphellis *punctiformibus substipitatis clausis* albis, apotheciis marginalibus et sparsis liberis subpedicellatis flexuosis extus ferrugineo-rufescentibus, disco *aterrimo* concavo s. plano demum inflexo convoluto, margine glaberrimis politis sæpe corrugatis thallode tenuissimo subnullo. (TAB. CXXV. B.)

HAB. Northern Island, *Colenso.* Bay of Islands, *J. D. H.*

Resembles *S. sylvatica,* as Dr. Hooker justly observes in a manuscript note. In every specimen, however, of *S. sylvatica* which I have examined, from various European localities (and they are tolerably numerous), the cyphellæ are distinctly urceolate and sunk in the thallus (never punctiform), and often of a considerable size; whereas here they are altogether different, bearing much resemblance to another species (*S. Wallichiana,* Tayl.!), collected in Nepal by Wallich and Hooker. Again, the apothecia which the older writers ascribe to *S. sylvatica* are those of a *Peltidea,* being situate at the very end of the digitate lobes; it is true that an error has long been suspected (see Fries, etc.), and Dr. Montagne informs me that Dr. Welwitsch has collected *S. sylvatica* "apotheciis biatorinis," like those of *S. fuliginosa,* I presume, which Fries describes; but these appear, from the figures in Engl. Bot. t. 1103, and from Fries's and Hooker's remarks, to be of a very different colour and structure. Neither does Delise's description of the *S. sylvatica,* var. *Peruviana,* accord either in the cyphellæ or the apothecia: "cyphellis *urceolatis* membranaceis albidis, apotheciis sparsis crassis disco brunneo-fusco margine evanescente in junioribus disco concavo *rufescente* margine *prominulo* subcrenato subinflexo." In truth the plant is, after all, far more nearly allied to *S. anthraspis,* Ach., which we refer to *S. foveolata,* but the lobes are not, as it seems, corniculate, and the apothecia are much larger and more free. The apothecia are in their very infancy closed, but very soon become remarkably open and free, almost stipitate; the thalline excipulum (which is often corrugated outside) is polished towards the edge, and this is so extremely fine that the disc appears to have no distinct margin. The thallus shows some slight symptoms of becoming isidiophorous, with sooty processes; but these do not assume a distinct coralline form, as in *S. sylvatica.* The upper and under lobes have a strong tendency in this plant to adhere to each other, so as to become absolutely united at certain points, and not to be separated without rupturing the thallus.—PLATE CXXV. B. Fig. 1, plant, *nat. size;* 2, portion of apothecium and asci; 3, ascus; 4, immature sporidia; 4, mature sporidium:—*all highly magnified.*

** *Cyphellæ large, urceolate, at length explanate.*

21. Sticta *fuliginosa,* Ach., *Meth. Lich. p.* 280. *Fries, Lich. Europ. p.* 52.

HAB. Northern Island, *Colenso.* (Barren.)

Apothecia unknown to me. Schærer (Enum. Crit. p. 32) calls them "submarginalia limbo ciliato radiosa, ciliis fugacibus." See also Hooker, Engl. Fl. vol. ii. pt. i. p. 206. The thallus of the New Zealand Lichen resembles the figure in Engl. Bot. A less divided plant, more rugose and less rufous than *S. sylvatica*, but probably not distinct from it. See Fries, and the remarks on the preceding species. Cyphellæ urceolate, white, then large, explanate. Mr. Colenso's specimen is the only extra-European one which I remember to have seen.

22. Sticta *cinereo-glauca*, Tayl.!; thallo tenui subcoriaceo suborbiculari lobato lobis subascendentibus amplis sinuatis (parum crenatis aut dissectis), supra glaberrimo glauco in ambitu plerumque cinerascente humecto (sæpe lætissime) viridi (præsertim in junioribus) subtus pallido rufescente breviter tomentoso, sorediis nullis, cyphellis pallidis urceolatis mox planis sæpe amplis, apotheciis appressis marginalibus et per thallum profusis minoribus, disco rufescente plano in senectute convexo et sæpe tuberculato, margine tenuissimo crenulato subcolorato evanescente.—S. cinereo-glauca, *Tayl.! Lich. Antarct. n.* 95. *ut supra.* (Tab. CXXVII. C.)

Hab. Northern Island, *Colenso, J. D. H.*

This species greatly resembles *S. limbata*, and probably is not distinct from it. The lead-coloured soredia of that species, however, are wanting, and the habit is somewhat different.—Plate CXXVII. C. Fig. 1, plant, *natural size;* 2, portion of apothecium, vertically cut; 3, asci; 4, sporidia:—*all highly magnified.*

23. Sticta *limbata*, Ach., *Meth. Lich. p.* 280. *Fries, Lich. Eur. p.* 52. *Schær.! Exs. n.* 557. A typo paullulum differt

Var. *subflavida*, Bab.; thallo magis diviso lobis longioribus lætius coloratis plus minus fusco-flavescentibus subtus fulvescentibus, sorediis granulosis plumbeis magis elevatis.—*Vix differt* S. Thouarsii, *Del. Stict. p.* 90. *t.* 8. *f.* 29.

Hab. Northern and Middle Islands, on wood, *Colenso, Lyall.* (Barren.)

This can hardly be distinguished with safety from the European Lichen. Delise's figure of *S. Thouarsii* well represents the ramification, and differs in nothing material except in the white soredia, which are decidedly lead-coloured in the New Zealand plant. Specimens, which Dr. Hooker appears justly to refer to *S. Thouarsii*, from the Falkland Islands, are more stunted in growth, are thicker and browner, and have whiter soredia, but even in them may be discovered a slight inclination to lead-colour in the younger stage. Apothecia unknown.

D. Hirsutæ, Bab.—*Frond foliaceous, lobed, often monophyllous, more or less hairy on the upper surface, especially when young. Apothecia distinctly and subpersistently setose externally* (*not merely pubescent or subciliate*). [This natural group includes *S. Humboldtii*, Hook., *S. cyathicarpa*, Del., *S. cometia*, Ach., but passes into the preceding through *S. tomentosa*, Ach., which has the thallus smooth above, and the apothecia less persistently hairy.]

24. Sticta *coriacea*, Tayl.!; "thallo coriaceo rufescenti-cinereo margine subtusque albido-villoso celluloso-scrobiculato, lobulis margine decurvis subcrenatis subtus concoloribus, gemmis marginalibus planis villoso-ciliatis, cyphellis albis concavis marginatis, apotheciis sessilibus concavis extus villosis disco rufescenti-nigro margine incurvo."—*Tayl. Lich. Antarct. n.* 90. *ut supra.* (Tab. CXXV. A.)

Hab. Northern and Middle Islands, *Colenso, J. D. H., Lyall.*

"Several inches wide; thallus thick, not shining, pale ochrey-brown, very uneven, the central parts ascending, the margins deflexed," *Tayl. l. c.* A very distinct species from every other in this enumeration; the thallus has somewhat the habit of *S. glomulifera*, Delise. *S. Humboldtii*, Hook., and *S. cyathicarpa*, Delise (*S. Kunthii*, Hook.), are allied, but abundantly different. So also is *S. cometia*, Ach., but, judging from Delise's ample description and neat figure, it cannot possibly be the same. *S. obvoluta*, Ach. (non Delise), which is undoubtedly *S. hirsuta*, Mont. Voy. au Pôle Sud, p. 188. pl. 15. f. 2 (opt.), resembles the present plant much, but the cyphellæ are punctiform,

bright yellow. A specimen of the former in my herbarium (from Aiton's collection) is named "*L. berberinus*, Menzies."—PLATE CXXV. A. Fig. 1, plant, *natural size;* 2, apothecia; 3, vertical section of portion of apothecium; 4, asci in different stages of maturity; 5, sporidium:—*all highly magnified.*

§ 3. *Cyphellæ wanting altogether, or only occasional.* (Pseudosticta, *Bab.*)

25. Sticta *herbacea*, Delise, *Stict. p.* 132. *t.* 16. *f.* 56. *Fries, Lich. Europ. p.* 55. *Schær.! Exs. n.* 560. *Raoul, Choix de Pl. de N. Z. p.* 33. Parmelia herbacea, *Ach. et Auctt.*

HAB. New Zealand (probably from Akaroa), *Raoul.*

Of this I have seen no New Zealand specimen, except a small (unnamed) fragment from the Paris Museum, which seems clearly to belong to it.—Widely dispersed over Western and Central Europe (Spain to Norway, Fries), the Canary Islands, Northern and Arctic America; found also in the Himalaya Mountains (Winterbottom!) and Peru (Flörke).

26. Sticta *Montagnei*, Bab.; thallo submembranaceo latissimo glauco subrufescente (humecto non mutato) foliaceo corrugato, lobis subsinuatis rotundatis crenatis ad margines squamulas foliaceas gerentibus subtus nudiusculo subferrugineo passim nigricante, cyphellis sæpius absentibus passim vero occurrentibus minutis prominentibus albidis clausis subobsoletis, strato medullari albo, apotheciis amplis liberis ubique sparsis sæpe confertissimis disco nigro, margine inflexo sæpe lacero subserrato folioloso.

HAB. Northern and Middle Islands, on wood, *Sinclair, Lyall.*

After a good deal of hesitation and consideration, I incline to Dr. Hooker's view, that this Lichen must be compared with *S. herbacea*, which it resembles on many accounts, but is at the same time most abundantly distinct. The apothecia are those of a *Sticta*, bursting from under the gonimic stratum, and remarkable for their crown-bearing leafy margin, which is singularly inflexed, so as often to conceal the disc in great measure. Sporidia minute, contained in elongated asci, subfusiform, not very regular in form, brown, not containing septa, so far as I could observe. The thallus also sometimes has manifest traces of cyphellæ, but other specimens would lead any one to consider them a *Parmelia*, as Dr. Montagne was disposed to do, to whom I dedicate the plant, which seems to be undescribed.

27. Sticta *glomulifera*, Delise, *Stict. p.* 129. *pl.* 15. *f.* 54, 55. *Fries, Lich. Europ. p.* 54. *Schær.! Exs. n.* 559.

HAB. Northern Island, on bark, *Colenso.*

The pulvinuli which are ordinarily found in the European form are wanting in Mr. Colenso's specimens. Tuckermann observes that they are always absent from the North American form. This species again is found over a very wide tract of country, not only extending over the great continents just mentioned, but also found in St. Domingo, according to Delise. We do not, however, remember to have seen specimens from any other part of the southern hemisphere, except New Zealand.

Gen. IX. PARMELIA, *Ach.*

§ 1. IMBRICARIA, *Fries, Lich. Europ. p.* 57.

1. Parmelia *perlata*, Ach., *Syn. p.* 197. *Fries, Lich. Eur. p.* 59. P. perlata *et* P. reticulata, *Tayl.! in Mack. Fl. Hibern. pt.* 2. *p.* 148. *Ejusd. Lich. Antarct. n.* 61 *et* 65, *ut supra.*

HAB. Probably common everywhere. Northern and Middle Islands, *Colenso, Hooker, Lyall.*

A variable species, of which the two following Lichens are perhaps but forms: they have, however, been minutely distinguished by Dr. Taylor in the Irish Flora. *P. perlata* and *P. reticulata* have the "buds (soredia) in marginal powdery clusters." *P. proboscidea*, Tayl., has the "buds on thallodal solid podetia," *i.e.* is isidiophorous; and *P. perforata*, Ach., has the thallus very thick and tough, reticulato-rugose, void of soredia and isidiophorous processes,

according to Taylor. Fries evidently includes *P. proboscidea*, Tayl., and *P. perforata*, Ach., under his *P. perforata*, as well as forms (marginibus elevato-pulverulentis) which Dr. Taylor would call *P. perlata* or *P. reticulata;* the two last-named plants differ very little. In *P. reticulata* "the surface is marked (towards the edges) with minute, whitish, elevated, reticulated lines," which are absent in *P. perlata;* in *P. reticulata* the soredia are coarse-grained, "and extend from the margin towards the axis of the lobes," being in *P. perlata* "greyish, elongate, curved, marginal clusters." Both forms are found fertile in New Zealand, and have been referred by Dr. Taylor to his two species above named.

2. Parmelia *proboscidea,* Tayl.!; thallo orbiculari glauco-viridi, sicco albido griseo, subtus atro-fibrilloso, lobis latis planiusculis rotundatis crenatis, sorediis *corallineis* apice fuscescentibus ciliis intermixtis, apotheciis anguste stipitatis disco concavo (rarius perforato), margine et excipulo sorediis exasperato.—*Tayl. in Mack. Fl. Hib. pt. 2. p.* 143. *Ejusd. Lich. Antarct. n.* 64, *ut supra.*

Hab. Northern Island, *J. D. H.*

3. Parmelia *perforata,* Ach., *Syn. p.* 198. *Tayl.! Fl. Hibern. pt.* 2. *p.* 140-141.

Hab. Northern and Middle Islands, *Colenso* (very fine), *Raoul.*

Thallus very thick, tough, destitute of stipitate buds (coralline soredia), finely reticulato-rugose. *Apothecia* very large, with tubular podetia, generally perforated by reason of the expansion of the disc and the inability of the excipulum to keep pace with it. (See Eschweiler in Mart. Fl. Brasil. p. 207.) *Cilia* of the thallus longer and stouter than in *P. proboscidea,* according to Dr. Taylor, from whom most of these remarks are derived. Fries partly distinguishes *P. perforata* from *P. perlata* by the ciliated lobes of the former plant; but this character cannot well be relied on. The distinctness or identity of these three Lichens depends very much upon the resolution of this question: Can one and the same *Parmelia* produce sometimes pulverulent marginal soredia, sometimes scattered coralline ones, and at other times show no tendency to produce either? Dr. Taylor, in his 'Irish Flora,' has all along assumed the negative, and distinguished his species accordingly. Upon the whole, we are of the contrary opinion, but have preferred to allow these plants to stand apart, as they are separated by his characters, in order to attract attention to them. If his principle be admitted, and can be extended to other genera by analogy, other Lichens, *e. g.* our *Nephroma resupinatum*, var. *rufum*, must be specifically distinguished. *P. perforata* seems to affect warmer climates more exclusively than the two preceding (as the East Indies and tropical America), and none of them are found in the extreme northern or extreme southern regions; "in Europa boreali *P. perlata* prorsus desideratur" (*Fries*); it does not occur in his Summa Veg. Scandinaviæ.

4. Parmelia *saxatilis,* Ach., *Syn. Lich. p.* 203.

Hab. Northern Island, *Colenso.* (Fertile.)

A plant very generally diffused over the temperate and polar regions of both hemispheres, extending in each to the utmost limit of vegetation. It is also found within the tropical zone, probably at a considerable elevation, as in the Andes of Mexico, according to Dr. Hooker; also in South Brazil and the Mauritius (Eschweiler). The New Zealand specimens perhaps belong to *P. sulcata*, Tayl.!, distinguished from *P. saxatilis* by not having isidiophorous processes, but pulverulent soredia on the ridges, as well as by a somewhat different habit; but these have neither soredia nor coralline processes.

5. Parmelia *tiliacea,* Ach., *Syn. Lich. p.* 199. *Schær.! Exs. n.* 358.

Hab. Northern Island, *Colenso.* (Fertile.)

Specimens more rugose and more finely divided than usual, but evidently only a form of this species. Found also in Tasmania; a very aged specimen from New Holland (Swan River), in Herb. Hook., appears to belong to this Lichen (*P. endoleuca*, Tayl.! in Hook. Lond. Journ. vol. vi. p. 167). Widely diffused over Europe, from Spain to Lapland, but local (Fries); found also in the Canary Islands and the Indian peninsula (Montagne), and lately collected in the Himalaya Mountains by Messrs. Strachey and Winterbottom. Common also in North America (Tuckermann).

6. Parmelia *physodes*, Ach., *Syn. Lich. p.* 218.

Var. *β. enteromorpha*, Tuckerm., *Syn. N. Amer. Lich. p.* 28. P. enteromorpha, *Ach. Syn. Lich. p.* 219. *Hook. fil.! Fl. Antarct. p.* 532 *cum syn.*

HAB. Northern Island, *Colenso.* (Barren.) Var. *β*. Northern and Middle Islands, *Colenso, Lyall.* Fertile, and apparently more common than the preceding.

In *β* the habit is different, the laciniæ being lax and more elongated, but "evidently passing into *a*," according to Mr. Tuckermann. Its claims to be considered as a distinct species are considered doubtful by Dr. Hooker (*l. c.*). This very polymorphous species occurs commonly in the Old and New World, from the Polar regions to the vicinity of the tropics (*e. g.* California and the Canary Islands), and is even to be met with a little within them, as in the Mauritius, according to Dr. Hooker. Whether it has been met with nearer to the equator we know not.

7. Parmelia *diatrypa*, Ach., *Syn. Lich. p.* 219. P. terebrata, *"Mart. Fl. Crypt. Erlang." Tuckerm. Syn. N. Amer. Lich. p.* 28. P. pertusa, *Schær.! Exs. n.* 365. *Enum. Crit. Lich. Eur. p.* 43. P. physodes *var.* (*'monstrositas tantum est'*), *Fries, Lich. Europ. p.* 64. *Eschweiler in Mart. Fl. Brasil. p.* 203. *Mont. Voy. au Pôle Sud, p.* 182.

HAB. Northern Island; apparently common, *Colenso, etc.* (Fertile.)

Many distinguished Lichenists unite this to the preceding, but it seems to be distinct; the terebrations are exceedingly constant, as I have repeatedly observed while botanizing in the Alps, and besides the habit is different, the plant being more appressed. If it be a mere monstrosity, it is not easy to see why it should be so rare in Britain, while the former is so common. In New Zealand, if one may judge by the amount collected, the converse appears to be the case, *P. diatrypa* being abundant and *P. physodes* rare.—Found over a great part of the cold and temperate zones of both hemispheres; also in the Sandwich Islands (Hook. fil.).

8. Parmelia *olivacea*, Ach., *Syn. Lich. p.* 200. P. imitatrix, *Tayl.! in Hook. Lond. Journ. Bot. v.* 6. *p.* 161.

HAB. Northern Island; on stone, fertile, *Colenso.*

This Lichen is perhaps as variable in our antipodes as with ourselves. All Mr. Colenso's specimens are on stone, but some of them have long linear lobes, about $\frac{1}{8}$ of an inch wide, while in others the thallus is diminished into a rough stellated crust, with exceedingly narrow lobes; the colour is of all shades, between olive-green and umber. None of them have soredia or coralline processes.—A very common plant in the temperate and cold regions of the northern hemisphere, both in Europe and America. Dr. Hooker has collected it in Tasmania, and Drummond on the Swan River, Australia.

9. Parmelia *conspersa*, Ach., *Syn. Lich. p.* 209.

HAB. Northern and Middle Islands; on stone, probably common, *Colenso, Lyall, etc.* (Fertile.)

Variable as to the mode of division of the thallus; some specimens resemble our common form, others are more like var. *stenophylla*, Ach., Moug.! Exs. n. 940, but are more handsome, the lobes being more free, and of a more graceful, undulating form. Some specimens are isidiophorous. *P. Tasmanica*, Tayl.! Lich. Ant. n. 70, is merely a fine large state of the common *P. conspersa*, without a single character to distinguish it. I am quite at a loss to perceive on what principle Dr. Taylor has called some specimens by one name and some by another in the Hookerian Herbarium; this form has been collected by Hooker in New Zealand as well as in Tasmania.—Widely spread over Europe and North America, and reaching to the Arctic Circle. Found also in the Canary Islands. In the southern hemisphere it is perhaps less general; an Amazonian Lichen, however, mentioned by Eschweiler, seems to be a form of it (Mart. Fl. Brasil. p. 210). I have a specimen from (tropical or subtropical?) South America, growing with *Grammitis serrulata*, Sw., and another from the Mauritius, but it is absent from the 'Flora Antarctica.' *P. mutabilis*, Tayl.! (in Hook. Lond. Journ. Bot. vol. vi. p. 171), collected in Uitenhage by Zeyher, seems to me in no way different from *P. conspersa*.

10. Parmelia *moniliformis,* Bab.; thallo subcoriaceo suborbiculari ad centrum diviso angustifolio multifido, laciniis decumbentibus subliberis linearibus repetitim furcatis subcanaliculatis lævibus passim subconstrictis, supra glaucescente-ochroleuco nigro-punctato in senectute verrucoso rugoso, subtus tomentoso villis crispatis brevibus umbrinis in pulvinulos subdiscretos moniliformes epidermide rupta secedentibus, fibrillis rigidis paucis interjectis, apotheciis elevatis liberis subtus pubescentia umbrina crispata villosis, disco castaneo margine juniore integro demum in senectute lobato crispato. (Tab. CXXVII. B.)

Hab. Northern Island, on wood (of *Coniferæ*), *Colenso.*

A remarkable Lichen, and having its under surface very different from any other which I have seen. The brief description of the barren *P. relicina* given by Fries (Syst. Orb. Veg. p. 283) agrees in some respects:—"thallo angustifolio stellatim appresso polito pallescente, subtus margineque e villo stipatissimo eleganter *crispo!* aterrimo" (Ins. Rawak); but the thallus in our plant is scarcely polished, and is certainly not *aterrimus* below. The *P. relicina, β,* Fries, Lich. Eur. p. 70, is referred by Montagne (Ann. des Sc. Nat. 1841. p. 115, et 1842. p. 19) to *P. sinuosa,* Ach., which is assuredly a different species from the New Zealand Lichen; the appearance is not very unlike that of the larger states of *P. ambigua,* Ach., or *P. conspersa, stenophylla,* Ach. (especially the free-growing New Zealand forms); our species, however, has neither the pulverulent soredia of the one nor the coralline processes of the other, but in old-age is full of very rugged nigro-punctate warts, through which the white medullary stratum occasionally appears. *P. leonora,* Spr. (where described?), var. *multifida,* Flotow! in Linnæa, 1843, p. 28, agrees very fairly in its upper surface (to judge from a small specimen and the description), but the under side is altogether different, being simply furnished with long wiry fibrillæ. The extraordinary appearance of the under side (which is most apparent in the younger specimens) seems partly due to a tendency in this Lichen to a kind of constricted and soon ruptured inflation. We have a specimen of this plant from South Australia, collected by Lhotsky, for which, as well as for numerous other rarities, we are indebted to Mr. Borrer.—Plate CXXVII. B. Fig. 1, 2, plants, *natural size;* 3, portion of ascus cut vertically; 4, asci and sporidia; 5, portion of gonimial stratum:—*all highly magnified.*

11. Parmelia *parietina,* Ach., *Syn. Lich. p.* 200.

Hab. Northern Island; on rock, bones, etc., fertile, *Colenso, J. D. H.*

For the geographical distribution see Seemann's 'Botany of the Herald,' p. 48, and add Cuba to the habitats, on the authority of Montagne. The abnormal forms, as well as the type, occur in the southern hemisphere, and much resemble those of our own. A state which differs little from var. *concolor,* Fries, has been gathered (sterile) on bark by Mr. Colenso, as well as *Lepraria flava,* Ach., which is supposed to belong to the present Lichen.

12. Parmelia *chrysophthalma,* Ach., *Meth. Lich. p.* 267. *Fries, Lich. Eur. p.* 75. (*var. b.*) P. Sieberiana, *Laur.! in Linn.* 1827. *p.* 38. *t.* 1. *f.* 1. P. spinosa, *Tayl.! Lich. Antarct. n.* 69.

Hab. Northern Island, *Colenso.*

Thallus ascending, apothecia ciliated, agreeing with the English form and Schærer's specimens, n. 389. Found (especially on *Rosaceæ*) in most countries of South Europe adjoining the Mediterranean, also at both extremities of the South Coast of England, on the West Coast of France, the Channel Islands, and the Canary Islands (on *Cactus*); more rarely inland, as in Switzerland and parts of the south of France; also in several parts of North America, especially those which are washed by the Atlantic. In the South it adorns the horrid branches of the Cape *Acaciæ* (Flotow), extends to New Holland, Tasmania, and Chili, but avoids the cold of the Antarctic regions. *P. Sieberiana,* Laur.! (*P. spinosa,* Tayl.! exactly) is certainly this species, with the thallus finely cut, and the apothecia not ciliated.

§ 2. Physcia, *Fries.*

13. Parmelia *pulverulenta,* Ach., *Syn. Lich. p.* 214. *Raoul, ut supra.*

Hab. Middle Island: Cook's Straits, *D'Urville.*

I have not seen specimens from New Zealand.

14. Parmelia *speciosa,* Ach., *Syn. Lich. p.* 211.

HAB. Northern Island, barren, *Colenso, etc.*

A species widely dispersed; among its habitats are Europe (middle and south principally, but also in Norway), North America, Atlantic islands, Abyssinia, West Indies, Peru, Himalaya Mountains, East Indies, and New Holland.

15. Parmelia *picta?* Ach., *Syn. Lich. p.* 211. *Swartz, Lich. Amer. t.* 2. *f.* 1. P. applanata, *Fée, Essai, p.* 126. *t.* 32. *f.* 2. *Mont.! Crypt. Cub. p.* 223. *t.* 8. *f.* 1 *opt.!* P. plumosa, *Tayl.! in Hook. Lond. Journ. Bot. v.* 6. *p.* 173.

HAB. Northern Island, barren, *Colenso.*

Mr. Colenso's specimens being barren, it is difficult to speak certainly respecting them; they appear to belong either to *P. obsessa,* Ach., or to this species, but are rather more foliaceous than common. Apparently distinct from the preceding by its appressed and far less foliaceous thallus, which bears usually, in its centre, elevated globose soredia; yet Mr. Colenso's specimen looks a little ambiguous, and Dr. Montagne remarks on a Tahiti specimen, "in priorem (*P. speciosam*) abire videtur: an tantum confinis?"—Ann. des Sc. Nat. t. x. (ser. iii.) p. 125. His work on Cuba should by all means be consulted for this and the allied species. He has lately pointed out, in his 'Cryptogamia Guyanensis,' the probable identity of *P. applanata,* Fée, with *P. picta,* Sw. (not Montagne), in which I entirely agree. Found likewise in the West Indies, South America (the warmer parts), New Holland, Islands of the Pacific, and the East Indies.

16. Parmelia *stellaris,* Ach., *Syn. Lich. p.* 216.

HAB. Northern Island, *Colenso.*

Universal throughout Europe and North America; found also in the Canary Islands, India, and the Antarctic Regions.

17. Parmelia *leucomela,* Ach., *Meth. Lich. p.* 256. *Fries, Lich. Eur. p.* 76. *Tayl. Lich. Antarct. n.* 62.

HAB. Northern Island: Bay of Islands, *J. D. H., fid. Taylor.*

I have seen no specimens from New Zealand.

§ 3. ZEORA, *Fries, Syst. Orb. Veg. pr. p.*—*Amphiloma* et *Psoroma,* Fries, *Lich. Europ.*

[The Lichens comprehended under *Amphiloma* and *Psoroma* seem too nearly allied to be divided into different tribes; some very eminent lichenists consider the species which Fries places under the latter tribe as mere varieties of some of his *Amphilomata.* As to the limitation of species, no tribe of Lichens is more perplexing; it should be well studied by southern botanists, for the temperate parts of the southern hemisphere, and especially (according to Fries) the Islands of the Pacific, are the native seat of most of its species. We have received some specimens from Mr. Colenso which we cannot name with satisfaction, and have preferred omitting them rather than hazarding very dubious conjectures.]

18. Parmelia *gossypina,* Mont., *Crypt. Cub. p.* 217. *t.* 6. *f.* 3. Lecidea, *Ach.*

Var. *filamentosa,* Mont., *Crypt. Guyan. n.* 95, *in Ann. Sc. Nat. t.* 16. (*ser.* iii.) Byssocaulon niveum, *Mont. Fl. Juan Fern. p.* 9. *n.* 52, *in Ann. Sc. Nat. t.* 3. *p.* 355. (*ser.* ii.)

HAB. Northern Island, *Colenso.* (On moss, barren.)

For this extraordinary form, see an admirable account by Dr. Montagne, in his 'Cryptogamia Guyanensis.'—A Lichen of the West Indies and South America. I have not seen the normal form from New Zealand.

19. Parmelia *Gayana,* Mont.; "thallo foliaceo membranaceo cinereo-plumbeo ambitu laciniato, laciniis amplis rotundatis subintegris concentrice sulcatis, hypothallo [primitus albido, dein] cærulescente stupposo, apotheciis sparsis confertisque excipulo colorato proprio [et sæpius altero thallino] marginatis,

disco rubricoso tandem fuscescente marginemque excludente."—*Mont. in Ann. des Sc. Nat. t.* 11. *p.* 58. (*Ser.* iii.)

HAB. Northern Island, fertile, *Colenso.* (Very sparingly collected.)

A very handsome plant, which agrees in every respect with the excellent description of Dr. Montagne, recently published. The ally of this Lichen is evidently *P. plumbea*, which, however, has a much thicker, radiately rugose thallus: yet, in fact, *Coccocarpia molybdæa*, Pers., as Dr. Montagne truly remarks, bears a greater general resemblance; and I have seen specimens of *Parmelia tiliacea* by no means unlike it at first sight. On Mr. Colenso's specimens some apothecia have a well-marked double border, one formed by the disc, another by the thallus. First described from Chili specimens, collected by M. Cl. Gay, and found last year in the Venetian Alps by Professor Massalongo.

20. Parmelia *plumbea*, Ach., *Syn. Lich. p.* 202. *Fries, Lich. Eur. p.* 87. *Tayl. Lich. Antarct. n.* 55.

HAB. Northern Island, *J. D. H.*

Whether this species has been found in New Zealand seems doubtful; two or three specimens so named by Dr. Taylor appear to me to belong to other species; he indeed, as well as others, unites *P. rubiginosa* to *P. plumbea*, and *L. microphylla* also, contrary to the views of Fries, whose arrangement falls in with such comparatively few observations as I have been able to make on the living and dried plants. *P. plumbea* occurs in the west of Europe, from Spain up to Nordland, also in the Canary Islands and Madeira, but is not included in Tuckermann's Lichens of North America, and we have not seen a specimen from the southern hemisphere.

21. Parmelia *rubiginosa?* Ach., *Syn. Lich. p.* 202. *Fries, Lich. Eur. p.* 88.

Var. β. *sphinctrina*, Hook. fil.! *Fl. Antarct. p.* 533; "thallo stellato lurido-cervino subtus badio fibrillis brevissimis matrici toti adglutinato, laciniato, laciniis centro concretis ambitu sublinearibus inciso-multifidis subapplanatis margine squamuloso granulatis crenulatisque, apotheciis confertissimis margine thallode striato."—*Mont.* P. sphinctrina, *Mont.! Fl. Fernand. n.* 84; *ejusd. Voy. au Pôle Sud, p.* 180. *pl.* 15. *f.* 3 *opt.* P. rubiginosa, *Tayl.! Lich. Antarct. n.* 56. *pr. p.*

Var. γ. *araneosa*, Bab.; thallo coriaceo amplo foliaceo lobato appresso ambitu libero sinuato subcrispato, supra inæquabili squamulis graniformibus obsesso viridi-rufescente madore paullum mutato, versus margines araneoso-tomentoso, subtus subsericeo striato pallido nudo, apotheciorum disco castaneo-fusco margine subfoliaceo crenato lobato subtus corrugato granuloso.

HAB. Northern Island, *Colenso.* Var. β. Northern and Middle Islands, abundant, *Colenso, Lyall, etc.* Var. γ. Northern Island, creeping over Mosses and *Jungermanniæ*, on wood; also apparently on the ground or rock, *Colenso, J. D. H.*

A few specimens approach the European type in having the thallus unequable, the lobes shorter, and the blue hypothallus distinct, but not exactly coinciding with it; the greater part belong to a plant which may probably be only another form of the same species, viz. to *P. sphinctrina.* This Lichen is closely allied, at all events, to *P. rubiginosa*, Ach., but is very coriaceous, having the colour of *Biatora lurida*, as Dr. Montagne well remarks. It also grows in patches close to the bark, so that the hypothallus is commonly almost obliterated, but an inspection of numerous specimens has clearly shown me that it is really blue and spongy when perfect; it must consequently be regarded as an *Amphiloma.* The apothecia are remarkable, "margine incurvo ætate sinuoso crenulato-striato;" but *P. rubiginosa* sometimes produces fruit not dissimilar. *P. sphinctrina* is found in Juan Fernandez, Chili, the Antarctic regions, and Tasmania. An imperfect specimen or two of this Lichen (or perhaps of *P. rubiginosa*) is pulverulent on the margins with a dirty white meal, looking very different from *P. conoplea.* An analysis of the European *P. rubiginosa* presented a very similar appearance to that of *P. sphinctrina*, as figured by Montagne, as respects the form of the *asci* and *sporidia.*—In var. γ. *araneosa* the thallus is several inches broad, stiff and hard, very

unequable, wholly appressed to the matrix, except towards the margins, which are free; in the form of the lobes it is not unlike *Biatora placophylla*, Fries. The aged thallus is smooth, but towards the edges is speckled with a cobweb-like down; under side yellowish-white, silky, with ridges here and there, but without fibres; these, however, would probably occur if the plant were to grow in a situation more favourable to their development. Apothecia not altogether dissimilar to those of *P. crenulata*, Hook. This Lichen, which I had once supposed a very distinct species, should probably be referred to *P. rubiginosa*. Dr. Montagne also had remarked to me, in a letter, its affinity with his *P. sphinctrina*.

22. Parmelia *conoplea*, Ach., *Syn. Lich. p.* 213. *Moug. et Nestl.! Exs. n.* 347. P. rubiginosæ *var.*, *Fries, Lich. Eur. p.* 38. *Schær. Enum. Crit. p.* 36.

Hab. Northern Island, *Colenso.* (Barren.)

Easily distinguished from *P. rubiginosa* by its masses of blue gonidia scattered over the thallus, which has usually a yellower tint and thinner consistence; but in the opinion of most lichenologists it is not an autonomous species. It seems, however, to be as distinct as most Lichens of this section, and also to have a somewhat different geographical range. *P. conoplea*, according to Schærer, alone is found in Switzerland, and is certainly not rare in the Austrian Alps, where I have never seen *P. rubiginosa*. Rabenhorst says that *P. conoplea* is not rare in Germany, while *P. rubiginosa* very seldom occurs. Conversely, *P. rubiginosa* occurs in four out of the six districts into which Fries divides the Scandinavian Flora, and *P. conoplea* only in one. In Britain *P. rubiginosa* is not uncommon, while *P. conoplea* is rare, though found in Sussex by Mr. Borrer, who pointed it out to me in St. Leonard's Forest; and also in Wales, where Mr. Hort has lately gathered it.

23. Parmelia *lanuginosa*, Ach., *Syn. Lich. p.* 201. *Fries, Lich. Eur. p.* 88.

Hab. Northern Island, *Colenso.* (Barren.)

Apothecia like *P. plumbea*, according to Fries. Possibly more than one species has been comprehended by authors under this name; but, as Mr. Colenso's plant is barren, little more can be said of it.

24. Parmelia *triptophylla*, Fries, *Lich. Eur. p.* 91. *cum syn.*

Hab. Northern Island, *Colenso, etc.* (On bark: several forms.)

Apothecia having a strong proper margin; disc ferruginous, becoming darker; scales much dissected, expanded on the inky hypothallus, which sometimes so predominates (in specimens collected by Dr. Sinclair) that the appearance is smoky all over. Referred by Fries to *Biatora*, in his Summ. Veg. Scand. Probably a cosmopolite.

25. Parmelia *pholidota*, Mont.! *Fl. Fernand. n.* 85. (Tab. CXXVIII. A.)

Hab. Northern Island, *Colenso.*

Mr. Colenso's plant is named by Dr. Montagne, but is so very like an authentic specimen of his *P. Saubinetii*, from France, with which he has favoured me, that I am almost unwilling to separate it. In that specimen there is no regular hypothallus, and I almost suspect that the white colour of the matrix must be accidental, or that the plant is parasitical on the hypothallus of another; the other characters are not very important. (See Fries's remarks on *P. triptophylla*, Lich. Europ. p. 91.)—A very pretty form, conspicuous for its pale bluish scales and flesh-coloured apothecia; and yet I much doubt if it be really distinct from the preceding very polymorphous plant.—Plate CXXVIII. A. Fig. 1, plant, *natural size;* 2, portion, *magnified;* 3, vertical section of apothecium; 4, asci; 5, sporidia:—*all highly magnified.*

26. Parmelia *nigrocincta*, Mont.!; "thalli squamulis membranaceis contiguis e centro radiantibus rotundato incisis explanatis rufis, hypothallo cærulescenti nigro effuso late marginante, apotheciorum disco plano rufo-fusco margine pallidiori integerrimo, thecæ ovatæ ascis cylindricis serie simplici inclusæ." *Mont. Fl. Fernand. n.* 88 (*Annal. des Sc. Nat. Juin,* 1835).

Hab. Northern Island, *Colenso.* (One specimen.)

This agrees exactly with a specimen from Juan Fernandez, kindly given me by Dr. Montagne. It does not

appear to be at all foliaceous, but the minute scales grow close to the black hypothallus; apothecia red, not unlike *P. erythrocarpia*, Fries; but the thallus is more like the young scales of *P. rubiginosa*. "*Parmeliæ muscorum* ut et *P. amniocolæ* proxima. Species omnino distincta." *Montagne, l. c.*

27. Parmelia *muscorum*, Fries, *Lich. Europ. p.* 95. Lecanora muscorum, *Ach. Syn. Lich. p.* 193. P. carnosa, *Schær.! Exs. n.* 482 (*sterilis*).

Hab. Northern Island, Bay of Islands, fertile, *J. D. H.*

A little-known species, confined principally to the north of Europe, but found also in the Falkland Islands.

28. Parmelia *Femsjonensis?*, Fries, *Lich. Europ. p.* 98.

Hab. Northern Island, on Moss, spreading over bark, *Colenso.*

Very like *P. hypnorum*, Fries, but the crust is differently coloured, and the much cut margin of the apothecia is smooth. I have no authentic specimen of this Scandinavian Lichen, but imagine from the description that Mr. Colenso's plant is the same as that of Fries.—Found also in Tasmania.

§ 4. Placodium, *Fries.*

29. Parmelia *gelida*, Ach., *Meth. Lich. p.* 188. *Fries, Lich. Europ. p.* 104. Urceolaria macrophthalma, *Tayl.! Lich. Ant. n.* 36. Lecidea marmorea *ejusd. n.* 9 (*non Ach.*).

Hab. Northern Island, fine and fertile, *Colenso.*

An alpine species, inhabiting Northern Europe and Iceland. Found also abundantly in Kerguelen's Land by Dr. Hooker.

30. Parmelia *coarctata*, Ach., *Meth. Lich. p.* 158. *Fries, Lich. Eur. p.* 104.

Hab. Northern Island, *Colenso.*

Crust granulated (var. δ, Fries), better developed than is usual in British specimens.—General throughout Europe, and we have received a specimen from Chili from Dr. Montagne.

31. Parmelia *fulgens*, Ach., *Meth. Lich. p.* 192. *Fries, Lich. Eur. p.* 119.

Hab. Northern Island, fine and fertile, *Colenso.*

Found in Europe generally, but local, reaching from the South to the Arctic Ocean; collected in the Canaries (Montagne), and in Malta by myself; occurring also in the alps of the Caucasus (Belanger).—Referred to *Biatora* by Fries in Summ. Veg. Scand. Lich.

32. Parmelia *elegans*, Ach., *Meth. Lich. p.* 193. *Fries, Lich. Europ. p.* 114.

Hab. Northern Island, on pebbles, etc., very fine, *Colenso.*

Thallus in aged specimens becoming white, in blotches, by discoloration. *Segments* sometimes constricted, and seeming as though inflated.—*P. elegans* penetrates as near perhaps to the North and South Poles as any vegetation extends. Mr. Sutherland has recently brought specimens from Prince Alfred's Bay, latitude 76° 25′ N., and Captain Parry found it in Melville Island; while Dr. Hooker observed a small form of it staining the face of the rocks "on the extreme limit of southern vegetation," in Cockburn Island, latitude 64° 13′ S. This pretty Lichen evidently agrees with the poet, "Fortibus omne solum patria est," for, to say nothing of other intermediate stations, it takes up an equidistant position on the globe in the Abyssinian Alps; sometimes it occurs at the sea-level, sometimes, as in the Himalaya mountains, it rises to 18,000 feet.

33. Parmelia *aurea*, A. Rich.; "thallo crustaceo suborbiculari albido maculis luteis latis irregularibus sparsis subelevatis notato glabro irregulariter inciso, lobis bullatis divisis superpositis obtusis subtus concolori glabro, apotheciis subsessilibus centro affixis luteis planis margine integro vix prominulo."—*A. Rich. Fl. N. Zel. p.* 23. *Voy. de l'Astrol. t.* 8. *f.* 1.

Hab. Middle Island: Astrolabe Harbour, on trees and rocks, *D'Urville.*

A handsome species, to judge by the figure, and allied (as it seems) to *P. elegans*. A. Richard compares it with *P. rutilans*, Ach. I have not seen it.

§ 5. Patellaria, *Fries.*

34. Parmelia *pallescens*, Fries, *Lich. Eur. p.* 132, *cum syn. Moug. et Nestl. Exs. n.* 1146.

Hab. Northern and Middle Islands, on wood and rock, *Colenso, Raoul.*

Mr. Colenso's specimens on wood have a membranaceous shining crust, on which the apothecia repose freely, like a *Peziza*, being fixed by little more than the centre; the pale, delicately coloured disc is surrounded by a very elevated thallodal border, snow-white and slightly wrinkled. An analysis shows the structure to be exactly the same as in the published specimens of Mougeot; the asci are obovate elongated, enclosing about six sporidia, which are oblong, not having a septum.

35. Parmelia *punicea*, Ach., *Meth. Lich. p.* 167. *Mont. Crypt. Cub. p.* 208 (*cum syn.*). Lecanora punicea, *Ach. Syn. Lich. p.* 174. *Fée, Essai, p.* 119. *t.* 29. *f.* 7.

Hab. Northern Island, on wood, *Colenso.*

See Montagne's excellent description and remarks in the work above cited.—Found in the West Indies and Tropical America; also in the African Islands, at the Cape (*fide* Taylor), and Java.

36. Parmelia *subfusca*, Ach., *Meth. Lich. p.* 167. *Fries, Lich. Eur. p.* 136.

Hab. Northern Island, *Colenso.*

Some specimens belong to the normal form, others to var. *albella*, Fries. The species is perfectly cosmopolitan, and is sometimes epiphyllous within the tropics.

37. Parmelia *atra*, Ach., *Meth. Lich. p.* 154. *Fries, Lich. Eur. p.* 141. *Mont. Crypt. Cub. p.* 207.

Hab. Northern Island, on bark, *Colenso.*

Probably as widely diffused as the preceding species.

38. Parmelia *sophodes*, var. *exigua*, Fries, *Lich. Eur. p.* 149 (*cum syn.*) Lecanora exigua, *Hook. Br. Fl. v.* 5. *pt.* 1. *p.* 187. *Tayl.! Lich. Antarct. n.* 38.

Hab. Northern Island, Bay of Islands, *J. D. H.*

I have not seen a New Zealand specimen which I can safely refer to this species. The Lichen so named by Dr. Taylor is in a very bad state, but more resembles *P. subfusca.*

39. Parmelia *frustulosa*, var. *thiodes*, Fries, *Lich. Europ. p.* 141. Lec. thiodes, *Sprengel, ex Friesio.*

Hab. Northern Island, on stones, *Colenso.*

The description of Fries seems well to agree. The present plant much resembles *P. subfusca*, but is distinctly granular, and of a yellowish colour.

40. Parmelia *varia*, Ach., *Meth. Lich. p.* 178. *Fries, Lich. Europ. p.* 156.

Hab. Northern Island, on stones, *Colenso.*

Extremely variable as this plant is, we suspect that Fries has combined too many species under the same name. It is probably very widely dispersed, and perhaps most of the European forms or nearly allied species will be found to occur in New Zealand.

41. Parmelia *aurantiaca*, var. *erythrella*, Fries, *Lich. Europ. p.* 166. *Schær.! Exs. n.* 223. P. erythrella, *Ach. Meth. Lich. p.* 174.

Hab. Northern Island, on stones, *Colenso.*

42. Parmelia *pyrophthalma*, Mont.! *Cent.* 4. *n.* 75. *in Ann. des Sc. Nat. Dec.* 1843 (*sub* Biatora). (Tab. CXXIX. A.)

Hab. Northern Island, on bark, *Colenso.*

Very nearly allied to *P. aurantiaca.* Our specimen is named by Dr. Montagne, who has given an ample description, and we have added a figure.—Plate CXXIX. A. Fig. 1, plant, *natural size;* 2, portion of thallus and apothecium; 3, vertical section of apothecium; 4, portion of ditto; 5 and 6, sporidia:—*all highly magnified.*

43. Parmelia *rupestris,* DC., *Fl. Franc. v.* 2. *p.* 360 (*sub* Patell.). P. aurantiaca, var. γ, *calva,* Fries, *Lich. Eur. p.* 167. Lecidea rupestris, *Ach. Syn. Lich. p.* 39. *Tayl. Lich. Antarct. n.* 19.

Hab. Northern Island, Bay of Islands, *J. D. H.* (*fid. Taylor*).

I have not seen a New Zealand specimen.

44. Parmelia *gyrosa?* Mont., *Crypt. Cub. p.* 212 (*cum syn.*). Lecanora Domingensis, *Ach. Syn. p.* 336. P. ventosa, Domingensis, *Eschw. in Mart. Fl. Bras. p.* 189.

Hab. Northern Island, on bark, overrunning *Hepaticæ, Colenso.*

Some incomplete specimens collected by Mr. Colenso appear to belong to this polymorphous West Indian and South American species. In addition to the synonyms given by Dr. Montagne, we should be inclined to add, with Eschweiler, *Lecanora versicolor,* Fée, Essai, t. 28. f. 4, and *P. chrysocarpa,* Meyer, in Spreng. Syst. Veg. p. 329. cur. post., judging from the description.

45. Parmelia *chrysosticta,* Tayl.! (*sub Lecan.*); "crusta tenui albida nigrolimitata (?), gemmis granulatis confertis, apotheciis confertis concaviusculis disco flavo-lutescenti pruinoso margine gemmis crenulato." —*Tayl. Lich. Antarct. n.* 50. Biatora Berteroana, *Mont.! Fl. Chil. ined. c. ic. et ejusd. Diagn. Phyc. n.* 13. *in Ann. Sc. Nat. t.* 18. (*ser.* iii). P. cerina, *Mont. Fl. Fernand. n.* 86. *ex ipso.*

Hab. Northern Island, on bark, *Colenso.* Bay of Islands, *J. D. H.*

"Crust several inches wide; the investing crust is studded with large granular buds, which sometimes bear on their tops minute orange spots, the rudiments of apothecia. The disc consists of a coarse yellow pruina, covering a deep tawny lamina. The shields are much larger than those of *L. ferruginea,* Hook., and have a conspicuous thallodal border." *Tayl. l. c.* Sir W. J. Hooker has written against a specimen "allied to *P. tartarea;*" and certainly this pretty plant appears far more near to that species than to *P. ferruginea,* and it seems to differ in nothing but in its smaller and much brighter apothecia: the hypothallus is not clearly visible, but it rather appears to be pale, as in that species. I endeavoured, to no purpose, to discover asci and sporidia; a section of the disc showed numerous elongated paler bodies imbedded in it, but these seemed to contain no vestige of sporidia; under the microscope the surface of the disc appears broken up into scales not unlike the thallus of *P. hypnorum,* Fries. Montagne describes the asci as very large, enclosing a single multicellulose sporidium. Some of the smaller specimens much resemble *P. cerina,* but they show the same (morbosely?) pruinose disc as the larger specimens.

Obs. Mr. Colenso has collected two or three specimens of a *Patellaria* unknown to me, which may possibly be *P. atrocinerea,* Fries. His description and the figure in E. Bot. (t. 2096) agree pretty well; but in the absence of an authentic specimen I am compelled to pass his plant over without further notice.

§ 6. Urceolaria, *Fries.*

46. Parmelia *scruposa,* Fries, *Lich. Europ. p.* 190. Urceolaria scruposa, *Ach. et Auctt.*

Hab. Northern Island, *Colenso.*

A very widely dispersed species, occurring over Europe and North America, from the Arctic Circle southward, and I have it from Malta and Madeira. It is found likewise in the Canary Islands and at the Cape of Good Hope.

47. Parmelia *verrucosa,* Fries, *Lich. Europ. p.* 186 (*cum syn.*). *Schær.! Exs. n.* 120.

Hab. Northern Island, accompanying *P. rubiginosa,* var. *araneosa,* Bab., *Colenso.*

Mere fragments occur in the collection, but they manifestly belong to this species. It is widely diffused over

the alpine continent of Europe, from the Pyrenees to Lapland; it occurs also in Britain, being, as Mr. Leighton informs me, the *Pertusaria* figured at pl. xi. fig. 2 of his valuable work on the British Angiocarpous Lichens. I much doubt if *Thelotrema Hutchinsiæ*, Borr., be anything different. This species passes into the genus *Thelotrema*, as Fries observes in his Summ. Veg. Scand.

Gen. X. THELOTREMA, *Ach.*

1. Thelotrema *lepadinum*, Ach., *Syn. Lich. p.* 115. *Fries, Lich. Eur. p.* 428.

HAB. Northern Island, common, *Colenso, etc.*

In some of Mr. Colenso's specimens the crust is very thin. Occurs in Europe universally, the extreme north excepted; likewise in Arctic, North Temperate, and South Tropical America; found also in Lord Auckland's Group abundantly, and at Cape Horn.

Gen. XI. GYALECTA, *Ach.*

1. Gyalecta *cupularis*, Schær., *Spicil. p.* 79. *Fries, Lich. Eur. p.* 195. Lecidea marmorea, *Ach. Syn. Lich. p.* 46. *Tayl. Lich. Antarct. n.* 9.

HAB. Northern Island; Bay of Islands, *J. D. H., fid. Taylor.*

I have not seen a New Zealand specimen; and a Lichen collected there by Dr. Hooker, and so named in Herb. Hook. by Dr. Taylor, evidently belongs to *P. gelida.*

TRIBE II. *LECIDINÆ.*

Gen. XII. STEREOCAULON, *Ach.*

1. Stereocaulon *ramulosum*, Ach., *Syn. Lich. p.* 284. *Swartz, Lich. Amer. p.* 20. *t.* 14 (*bon.*). *Hook. fil.! Fl. Antarct. pp.* 196. 529. *t.* 80. *f.* 1 (*bon.*).

Var. β. *macrocarpum*, Bab.; podetiis erectis elongatis subramosis *granulatis*, apotheciis majoribus globoso-depressis lobulatis.—S. macrocarpum, *A. Rich., Fl. N. Zel. p.* 34. *Voy. de l'Astrolabe, t.* 9. *f.* 4 (*bon.*).

Var. γ. *compressum*, Bab.; podetiis pumilis, fibrillis subfoliaceis plano-compressis densissime stipatis ramosis subtus pallidis, apotheciis convexis subimmarginatis.

HAB. Apparently very common everywhere, on stones and earth, also on trees, *Menzies and all travellers.* Var. β. Middle Island: Havre de l'Astrolabe, *A. Richard.* Port Nicholson, *Lyall.* Var. γ. Northern Island, *Colenso.*

Occurring in America from Mexico (Galeotti!) to the Straits of Magellan, and, as it seems, running through every parallel of latitude between them, but not found further south, according to Dr. Hooker. "In the Old World," he adds, "it first appears in Bourbon, thence ranging from the Philippines through Java, Australia, the South Sea Islands, Tasmania, and New Zealand, to Lord Auckland's Group and Campbell's Island; abounding in rocky and damp places, also on the trunks of large trees." Collected also at the Cape by Fraser, in the West Indies by Swartz, and in the Himalaya Mountains by Winterbottom, growing at altitudes of 8,700 to 11,500 feet above the sea. A variable plant it is, as may easily be supposed from its general occurrence; and that, both as to the thickness of its stems, the length of its fibres, its ramification, the size, shape, and position of its apothecia; but I am not able to agree with Dr. Hooker in thinking that *S. corallinum* may be one of its forms. The foveolated pale appendages (cephalodia) almost always reveal the present species, and I fear that *S. Argus*, Hook. fil. et Tayl.!, is only a magnificent form of it. Being unwilling to encumber these pages with a list of forms which are best learned by an inspection of numerous specimens, I have thought it necessary to mention only the chief varieties.—The best marked specimens of var. β, from Dr. Lyall, are barren, but there is no sensible difference between the fruit of the type and

this form; their size is variable. Among the granulations the fibres are not uncommonly scattered. Dr. Montagne has rightly reduced this form to *S. ramulosum* (Voy. Pôle Sud, p. 178).—Var. γ is from one to two inches high; it is a different-looking plant from the type, but has the cephalodia proper to the species.

2. Stereocaulon *Colensoi*, Bab.; thallo horizontali granuloso disperso (evanescente?), podetiis stipatissimis rigidis validis basi coalitis superne albidis corrugatis inferne fulvescentibus, fertilibus fibrillis rigidis verrucisque usque ad medium vestitis, superne nudis bi-trifurcatis, apotheciis in racemos laterales et terminales congestis junioribus clausis purpureis disco demum explanato amplo plano atropurpureo, excipulo tenui flexuoso subtus corrugato, cephalodiis subcæruleis irregularibus subpyriformibus congestis coalitis corrugatis rugis anastomosantibus. (Tab. CXXX. A.)

Hab. Northern Island, on rock, *Colenso.*

An extremely handsome Lichen, and, so far as I can judge from somewhat scanty materials, a distinct species. It is allied to the preceding, but a much stiffer and stronger plant (more so than even *S. Argus*, Hook. fil. et Tayl.!) and bearing very different cephalodia. The fertile podetia, even when young, are almost entirely void of fibres on their upper half, but a barren specimen is clothed with thick rigid fibres and warts up to the summit. The young densely-clustered apothecia are very like a miniature bunch of purple grapes, whence Mr. Colenso suggested the name of *S. botrys*, which, however, cannot well be retained, as there is already a *S. botryosum*, Ach. The adult apothecia resemble *S. Argus.*—Plate CXXX. A. Figs. 1, 2, and 3, different forms of *S. Colensoi*, *natural size;* 4, branch of thallus, with cephalodia; 5, vertical section of cephalodium; 6 and 7, ditto of apothecium:—*all highly magnified.*

3. Stereocaulon *denudatum*, Flörke, *Fries, Lich. Eur. p.* 204.

Hab. Northern Island, *Colenso.*

Specimens barren, but safely referable to this species. A common plant in the northern hemisphere, ranging from the Canary Islands and the Pyrenees to Lapland in the Old World, and from Mexico to Greenland in the New; it occurs also at Cape Horn, in the southern hemisphere.

Gen. XIII. CLADONIA, *Hoffm.*

An extensive genus, found all over the world, whose species are not easily limited.

§ 1. Granulosæ, Fries, Summ. Veg. Scand. p. 111. *Cladonia*, Sect. II., Fries, Lich. Eur. p. 242.—*Horizontal thallus often evanescent (or altogether wanting?). Podetia branched, naked, not cup-bearing, neither granular nor squamulose nor pulverulent.*

1. Cladonia *retipora*, Flörke, *Comment. de Cladon. p.* 181. *Mont. Voy. au Pôle Sud, p.* 177. Cenomyce retipora, *Ach. Syn. Lich. p.* 248. Bæomyces retiporus, *Labill. Pl. N. Holl. v.* 2. *p.* 110. *t.* 254. *f.* 2.

Hab. Northern and Middle Islands, common, generally on the ground in large patches, more rarely on rocks and trees, *Cunningham, Raoul, Lyall, etc.*

This noble species is also found in Tasmania and Australia.

2. Cladonia *aggregata*, Eschw., *in Mart. Fl. Brasil. v.* 1. *p.* 278 (*non Flörke*). *Mont. Voy. au Pôle Sud, p.* 176 (*cum syn.*). *Hook. Fl. Antarct. pp.* 197 *et* 532. *t.* 80. *f.* 2. Cenomyce aggregata, *Swartz, Lich. Amer. p.* 17. *t.* 12. *Ach. Syn. Lich. p.* 275. Dufourea collodes, *Tayl.! Lich. Antarct. n.* 102.

Hab. Abundant in the Northern and Middle Islands, *Cunningham, Raoul, etc.*

See Eschweiler (as above) for an excellent description, Montagne for other synonyms, and Hooker for the geographical distribution (adding the West Indies to the habitats) and good figures.

3. Cladonia *rangiferina*, Hoffm. *Flörke ut supra, pp.* 160–170. *Fries, Lich. Eur. p.* 243.

Var. *alpestris*, Ach. *Eschweiler* (*ut supra*), *p.* 273.

Hab. Northern and Middle Islands, fertile, *A. Richard, Colenso, etc.* Var. *alpestris*. Northern Island, *Sinclair.*

This Lichen ranges from Spitzbergen to Cape Horn, occupying almost all altitudes and all latitudes between them.

Obs. *C. uncialis* can hardly fail to be found in New Zealand, being very widely diffused, and occurring in the Antarctic regions.

§ 2. Squamulosæ, Fries, Summ. Veg. Scand. p. 110.—*Podetia rising from scales, and generally covered with them or with granules, or else pulverulent. Horizontal thallus scaly or foliaceous, generally present, sometimes evanescent.*—*Cladonia*, Sect. I., Fries, Lich. Europ. p. 208.

A. Perviæ, Fries, Lich. Eur. p. 227.—*Axils perforate, cups indistinct.* [A natural section, intermediate between the preceding and following; the thallus is usually less conspicuous than in the following group.]

4. Cladonia *furcata*, Hoffm. *Flörke, ut supra, pp.* 141–156. *Fries, Lich. Eur. p.* 229.

Hab. Northern and Middle Islands, *A. Richard, Colenso.*

Podetia, in Mr. Colenso's specimen, of a stiff, strong growth, swelling; axils widely gaping, the fissures sometimes extending along the podetia for some distance. Occurs in Tasmania and the South Polar regions, as well as over the northern hemisphere generally.

5. Cladonia *squamosa*, Hoffm. *Flörke, ut supra, pp.* 129–138. *Fries, Lich. Eur. p.* 231.

Hab. Northern Island, *Colenso.*

The specimen is barren, and shows no trace of perforation at the axils; but the habit so completely accords with the common European species, that there can be little doubt that it belongs to it. Mr. Colenso has found a plant which may probably be a state of this Lichen, or of the foregoing, but, being barren, this point can hardly be satisfactorily ascertained in so difficult a genus. The podetia are buried two inches deep or more among *Dicranum scoparium?* etc., and rise as much above it; they are twice or thrice forked, having the apices decurved and clothed with scales tolerably densely from the base to the summit; the bark becomes partly naked through the desquamescence of the epidermis, and is rather cartilaginous than membranaceous, though very flexible when moist; axils imperforate; colour glaucous green; scales pure white below. *C. squamosa* occurs in Tasmania and the Antarctic regions, as well as in all Europe and North America.

6. Cladonia *capitellata*, Bab.; thallo horizontali squamuloso viridi demum evanescente squamis subdissectis subtus albis nudis, podetiis nudis aut parcissime squamulosis erectis rigidis subramosis virescente-stramineis, *ramis strictis erectis*, apice fastigiato-ramosis pungentibus fuscis, axillis perforatis aut hiantibus, apotheciis breviter pedicellatis, disco fusco reflexo haud raro in senectute pertuso.—Cenomyce capillata (*lege* capitellata), *Tayl.! Lich. Antarct. n.* 122. (Tab. CXXX. B.)

Hab. Northern and Middle Islands, *Colenso, J. D. H., Lyall.*

This plant bears a considerable resemblance to *C. amaurocræa*, Schær.! Exs. n. 70, but is manifestly different, because it does not bear closed cups, but has only perforated axils. Neither can it be a form of *C. uncialis*, because that species has not a squamulose thallus. In fact, its real ally is *C. furcata*, from which it is readily, but perhaps not specifically, distinguished by a very different habit and colour. The podetia are from 1–3 inches high, very crowded, straight, or nearly so, the occasional main branches being also straight; the lips are brown and stellated. True cups none, but the perforated axils (especially in the younger plant) form spurious cups, being fringed with hort brown-tipped branches. The base of the old podetia becomes blackish in decay, and is tuberculated with whitish spots, which are portions of the ruptured epidermis. (Cf. *C. rangiferina.*) Whether this plant may pos-

sibly have been included by authors under *C. pungens* I know not; the Engl. Bot. figure (t. 2444) is not altogether unlike it, but Mougeot's specimens (n. 754) and Schærer's (n. 459) seem different, the latter (if not both) belonging to *C. furcata*. Bohler's specimen (n. 31) seems to be a state of *C. uncialis*, although Schærer (Spicil. pp. 311 and 562) refers it to his Exs. n. 81, which is manifestly a form of *C. furcata*. Fries speaks of the southern state of *C. pungens* as more remarkable than the northern: with this I am not acquainted. Dr. Taylor calls this *Cenomyce capitellata* in Herb. Hook., though it appears as *C. capillata* in the enumeration of Antarctic Lichens contained in the Lond. Journ. of Bot., by a misprint, as it seems; I have accordingly altered the name to *Cladonia capitellata*.—PLATE CXXX. B. Figs. 1 and 2, plants, *natural size;* 3 and 4, magnified podetia; 5, vertical section of apothecium; 6, portion of the same, with asci; 7, sporidia:—*all highly magnified.*

B. SCYPHOPHORÆ, Ach.—*Axils imperforate. Cups usually distinct.*

* *Apothecia brown.*

7. Cladonia *pyxidata*, Hoffm. *Fries, Lich. Europ. p.* 216.

HAB. Northern and Middle Islands, *Colenso, Lyall.*

Bad specimens, but probably belonging to this cosmopolitan species, which can hardly be absent from New Zealand. Mr. Colenso has also collected a form with epiphyllous apothecia (*C. cæspititia*, Auctt. pr. p.), which may probably belong to *C. pyxidata*. These abnormal developments are best traced to their origin in their native stations. The same gentleman has collected a curious plant, which I cannot safely refer to anything, though it is manifestly abnormal, named by him *Cenomyce viridis;* it grows on the trunks of some tree-fern (*Dicksonia squarrosa*, probably), and its thallus consists of green scaly powder (see Fries, p. 209), the apothecia being shortly pedicellate, with a fleshy stem (*Helopodium*, Auctt.), and symphycarpous. The crust is almost like *Lepraria viridis*, and even invests the fronds of *Grammitis australis*, which is epiphytical on the tree-fern.

8. Cladonia *verticillata*, Flörke, *ut supra, p.* 26. C. gracilis, *a*, verticillata, *Fries, Lich. Europ. pp.* 218, 219.

HAB. Northern Island, *Colenso, J. D. H.*

Dr. Hooker's specimens are fine, quite agreeing with our British *C. cervicornis*. Mr. Colenso's are very small, but appear to belong to this species.—General in the northern hemisphere; found also in Bourbon, Tasmania, New Holland, and the Antarctic regions.

9. Cladonia *gracilis*, Spreng. *Flörke, ut supra, p.* 30. *Fries, Lich. Europ. b et c, p.* 219.

HAB. Northern and Middle Islands, *D'Urville, Colenso.*

United by Fries to the preceding, but Flörke questions the propriety of the conjunction (p. 32). In the middle of England, in districts where *C. gracilis* abounds, I have never seen a specimen of *C. verticillata*, or of any form which approaches it. In Scotland, where both are common in the same localities, they appear to be always distinct.—Perhaps as generally diffused as the preceding.

10. Cladonia *degenerans*, Flörke, *ut supra, p.* 41. *Fries, Lich. Europ. p.* 221.

HAB. Northern Island, *Colenso.*

Mr. Colenso's plant agrees with Mougeot's specimens of *C. cariosa*, Ach. (n. 850), referred by Fries to *C. degenerans*.—An ambiguous species, more easily recognized than described, and very probably universally distributed, being found over a great part of Europe and North America.

11. Cladonia *fimbriata*, Fries, *Lich. Europ. p.* 222 (*cum syn.*).

HAB. Northern and Middle Islands, *Colenso, Raoul, etc.*

Mr. Colenso has gathered both the normal form and the var. *radiata*, Fries (*L. radiatus*, Auctt.).—A cosmopolite, as it seems.

12. Cladonia *decorticata*, Flörke, *ut supra, p.* 10. *Fries, Lich. Eur. p.* 226.

HAB. Northern Island, on wood, *Colenso.*

The description of Fries leaves no doubt on our mind that his plant is the same as ours.—A little-known species.

*** Apothecia scarlet.*

13. Cladonia *cornucopioides*, Fries, *Lich. Eur. p.* 236. C. coccifera, *Auctt.*

HAB. Northern Island, *Colenso.*

The only specimen gathered by Mr. Colenso is a well marked fertile example, having the lower part of the podetia granular, and the upper portion furfuraceo-pulverulent.—Universal throughout Europe and North America; also in tropical America, Tasmania, and the Antarctic regions.

14. Cladonia *Flörkeana*, Fries, *Lich. Eur. p.* 238. *Flörke, ut supra, p.* 99. *Schær.! Exs. n.* 36. *pr. parte* (*sub* C. filiformi). L. digitatus, *Engl. Bot. t.* 2439.

HAB. Middle Island, *Lyall.*

Specimens well-marked, fertile.—Found over a great part of Europe and in North America, and probably in many other parts of the world.

15. Cladonia *digitata*, Hoffm. *Fries, Lich. Eur. p.* 240.

HAB. Northern Island, *A. Cunningham, Colenso.*

Found in Europe, North America, and the West Indies. See below.

16. Cladonia *macilenta*, Hoffm. *Fries, Lich. Europ. pp.* 240, 241. C. filiformis, *Auctt. ex max. parte.*

HAB. Northern Island, *Colenso, J. D. H., Sinclair.*

This and the preceding are widely spread over the northern hemisphere, and it is to be suspected that they may be almost as general in the southern; the present Lichen has been found in Columbia, Chili, and the Falklands abundantly. Upon the whole, the species of this genus seem chiefly to affect the temperate and frigid regions, but several of them have been also found within the tropics.

The present enumeration of the New Zealand *Cladoniæ* is no doubt incomplete; *C. deformis* and *C. cornuta* occur in Europe, North America, and the Antarctic regions, and probably will be found in New Zealand.

Gen. XIV. BÆOMYCES, *Pers.*

1. Bæomyces *roseus*, Pers. *et Auctt.* B. fungoides, *Swartz! Lich. Americ. p.* 18. *t.* 13.

HAB. Northern Island, *Colenso, J. D. H.*

Swartz's Lichen from Jamaica does not seem to be more than a variety of the European; an authentic specimen is to be seen in the British Museum.—Found also in North America. Mr. Colenso's plant has much longer podetia than the European form, and would probably be called *B. fungoides* by those who distinguish two species.

Gen. XV. BIATORA, *Fries.*

a. *Thallo effigurato; aut squamuloso.*

1. Biatora *Colensoi*, Bab.; thallo effigurato subimbricato squamuloso, squamulis ascendentibus lobatis erosis glaucis (humore non mutatis), subtus nitide ferrugineis, strato medullari subferrugineo, apotheciis primitus concaviusculis nigrescentibus margine pallidiore, demum confluentibus difformibus immarginatis ferrugineo-nigris glaucescentibus intus ferrugineis.

HAB. Northern Island, on earth, *Colenso.*

A very remarkable species, and I believe undescribed; but allied to *B. testacea*, Fries, and apparently also to *B. icterica*, Mont. (Crypt. Gaud.). The thallus a good deal resembles that of a *Cladonia;* the scales are not so closely packed as in many species of this genus (e.g. *B. lurida*), but show at intervals the earth on which they are growing; they are also more finely divided than is usual for *Biatoræ*, though not so much dissected as *B. prolifera*, Mont.! Apothecia variable in size and shape, of a singular hue, owing to the coloured medullary stratum shining through; they are covered with a glaucous farina, which is but partially persistent, and somewhat resemble in general appearance those of *Biatora aurantiaca*, when they become confluent. The glaucous colour of the scales, taken in conjunction with the ferruginous inner stratum and under side, distinguish this Lichen at once.

2. Biatora *parvifolia,* Mont.! *Fl. Fernand. n.* 97. Lecidea parvifolia, *Pers.*

HAB. Northern Island, *Colenso.*

Found also in Brazil and Juan Fernandez. Allied to *B. vernalis.*

3. Biatora *byssoides,* Fries, *Lich. Europ. p.* 257. Bæomyces rupestris, *Auctt.*

HAB. Northern Island, Bay of Islands, on hill-sides, *J. D. H.*

Apothecia sessile or stipitate, flesh-coloured, nearly plane. *Crust* thin, inconspicuous.—Found throughout Europe and North America, also in Chili (Montagne).

4. Biatora *decipiens,* Fries, *Lich. Europ. p.* 252.

HAB. Northern Island, fertile, with *Endocarpon rufescens,* Ach., *Colenso.*

This beautiful Lichen ranges all over Europe and North America, and is also found in Malta (on calcareous soil), Cyprus, and the Canary Islands.

b. *Thallo crustaceo.*

5. Biatora *pachycarpa?,* Fries, *Lich. Europ. p.* 259. *Desmaz.! Pl. Crypt. Fr. Exs.* L. incanus, *Borr.! in E. Bot. t.* 1683.

HAB. Northern Island, on bark, *Sinclair.*

It is just possible that this may be some other species; the hypothallus is not visible in the only specimen preserved, and the thallus is not at all pulverulent; it is covered with little granular processes: the apothecia are less deeply coloured than in the European specimens, and less appressed to the crust. I am unwilling, however, to propose it either as a new species, or even variety, from insufficient materials, more especially as it is evident that the unequable bark on which it grows has prevented its full development. In other respects it agrees with European specimens received from Mr. Borrer and Dr. Montagne.

6. Biatora *marginiflexa,* Bab.; "crusta albido-glaucescenti tenui minute rimosa demum leprosa nigro-limitata, apotheciis majoribus confertis madore purpureo-nigris disco pruinoso convexo margine tenui flexuoso." *Tayl.* Lecidea marginiflexa, *Tayl.! Lich. Antarct. n.* 24. (TAB. CXXIX. B.)

HAB. Northern Island, *Colenso, J. D. H.*

"The lamina is shallow, whitish, and pellucid, resting on an equally shallow layer, which is brown, and lies on much white cortical matter." *Tayl. l.c.*

Dr. Montagne informs us that this does not appear to him to be distinct from *L. tuberculosa*, Fée, "ex spec. auctoris;" if so, Fée's figure (tab. 27. fig. 1) is indifferent. In appearance this plant (which appears to be rather variable, unless more than one species be included by Dr. Taylor and ourselves under one name) greatly resembles *L. parasema* and *L. premnea*, but is distinguished from both by the glauco-pruinose disc; the margin varies much in thickness and in colour; some specimens show the margin to be originally coloured, of a waxy hue and consistence: hence the species is properly a *Biatora*. Hypothallus black, often obliterated. This Lichen grows on the bark of *Trophis*, etc., also over the rhizomata of Ferns (*Niphobolus*). The same species has been collected in Brazil by Mr. Spruce, and is probably common in the south. Sporidia very large, about $\frac{1}{200}$ of an inch, oblong,

constricted about the middle, uniseptate, finely granulated.—PLATE CXXIX. B. Fig. 1, plants, *natural size;* 2, apothecia; 3, vertical slice of ditto; 4, asci; 5, immature, and 6, mature sporidia:—*all highly magnified.*

7. Biatora *vernalis?*, Fries, *Lich. Europ. p.* 260.

HAB. Northern Island, *Colenso, etc.*

Fries has certainly included several plants under this name in his 'Lichenographia,' and has changed his mind considerably in his Summa Veg. Scand. The sporidia differ much in the allied species, as my friend Mr. Leighton has convinced me. The New Zealand specimens appear to belong to Fries's form *luteola*, but I could not discover the sporidia in a specimen which I examined. Probably several forms or species occur in New Zealand.

8. Biatora *rosella*, Fries, *Lich. Europ. p.* 259. *Schær.! n.* 217.

HAB. Northern Island, *Colenso.*

9. Biatora *decolorans*, Fries, *Lich. Eur. p.* 266. *Moug. et Nestl.! n.* 551.

HAB. Northern Island, *Colenso.*

One specimen agrees with Mougeot's; another has the thallus thicker, more lobulate, the lobes margined with white, but it appears to be the same species.

10. Biatora *anomala?*, Fries, *Lich. Eur. p.* 269. L. cyrtellus, *E. Bot. t.* 2155. *Borr.!*

HAB. Northern Island, *Colenso.*

The range of this and the three preceding species is probably very extensive throughout the world.

11. Biatora *carneola*, Fries, *Lich. Eur. p.* 264. L. corneus, *E. Bot. t.* 965. *Borr.!*

HAB. Northern Island, *Colenso.*

12. Biatora *ceroplasta*, Bab.; thallo crustaceo hypophlæode demum prorumpente albido *ceraceo* minute granulifero crassiusculo diffracto subpellucido, apotheciis subliberis appressis majusculis planiusculis demum convexis rubris ceraceis nudis, junioribus subpellucidis, margine cupulari pallidiore carneo tenui evanescente.

HAB. Northern Island, *Colenso.*

It is with reluctance that I describe a new species of this difficult genus from a single specimen. The whole plant looks as if it were made of wax; it may in other respects be compared with *B. rosella*, Fries, but the apothecia are not in the least pruinose, the margin is thinner, and the colour of the disc of a deeper red, resembling that of *B. pachycarpa*, but not quite so dark. Colour of the disc flesh-coloured within, resting on a paler line, *i.e.* the cupular excipulum. I failed to discover asci or sporidia.

13. Biatora *cinnabarina*, Fries, *Lich. Eur. p.* 266. (TAB. CXXIX. C.)

HAB. Northern Island, on branches of shrubs, *Colenso.*

A beautiful little species, found also in Tasmania, North America, and Arctic Europe. Mr. Colenso's plant agrees exactly with a specimen from Dovrefeld.—PLATE CXXIX. C. Fig. 1, plant, *natural size;* 2, apothecia; 3, vertical slice of ditto; 4, more highly magnified portion of ditto; 5, sporidia:—*all highly magnified.*

OBS. Besides the above, there are several New Zealand specimens of this most difficult genus, which I cannot determine satisfactorily.

Gen. XVI. LECIDEA, *Ach. et Auct. pr. p.*

A. *Thallo effigurato.*

1. Lecidea *mamillaris?*, Duf., *Fries, Lich. Eur. p.* 285. *Schær.! n.* 575.

HAB. Northern Island, on rock and earth, *Colenso.*

Specimens indifferent, but agreeing very well with Schærer's plant, and with Fries's description of the French

Lichen, except that in one of Mr. Colenso's the fruit is pruinose. Apothecia coal-black within, on a thick stratum. Asci and sporidia not seen; acicular paraphyses abundant, coloured at their tips with black.

2. Lecidea *vesicularis*, Ach., *Meth. Lich. p.* 78. *Fries, Lich. Eur. p.* 286.

HAB. Northern Island, *Colenso.*

Another *Lecidea* has been sparingly collected by Mr. Colenso, which is seemingly allied to *L. cinereo-virens*, Schær.! n. 298, but I could not discover the structure satisfactorily: there were no asci, the disc was white within, margin carbonaceous. *L. vesicularis* is found all over Europe and in Arctic America, likewise in the Antarctic regions.

3. Lecidea *flavo-virescens*, Fries, *Lich. Eur. p.* 291.

HAB. Northern Island, *Colenso.*

Specimens very well developed, resembling *L. Wahlenbergii* in miniature.

B. *Thallo crustaceo subareolato.*

a. *Saxicolæ.*

The following enumeration is no doubt very incomplete, and I have been compelled to pass over without notice certain specimens which I cannot refer satisfactorily to their origin. The New Zealand species seem to be in almost every case identical with the European, and these last, it must be confessed, are at present extremely ill defined and understood, and it thus becomes impossible to say anything definite of their geographical distribution.

4. Lecidea *atro-alba*, Ach., *Syn. p.* 11. *Fries, Lich. Eur. p.* 310. *Tayl.! Lich. Antarct. n.* 2.

HAB. Northern Island, *Colenso.* Bay of Islands, *J. D. H.* (On flinty pebbles.)

A minute form, in which the hypothallus preponderates.

5. Lecidea *contigua*, Fries, *Lich. Eur. p.* 298. (*cum syn.*) L. speirea, *Ach. Tayl.! Lich. Antarct. n.* 10.

HAB. Northern Island, on calcareous rock, *Colenso.* Bay of Islands, *J. D. H.*

Crust thick, somewhat lobed; resembling the forms of South Europe in Mr. Colenso's specimens, thinner and less defined in Dr. Hooker's.

6. Lecidia *lapicida ?*, Fries, *Lich. Eur. p.* 306. *ex descr.* (*cum syn.*)

HAB. Northern Island, on primitive rock, *Colenso.*

According to Fries, Schærer's oxydated specimen n. 191, "vix differt" from his own *L. lapicida.* It seems to be very near Mr. Colenso's plant; the description of Fries also accords.

7. Lecidea *platycarpa*, Ach., *Syn. p.* 17. *Schær.! Exs. n.* 228. L. contigua, β platycarpa, *Fries, Lich. Eur. pp.* 300, 301. L. petræa, *Tayl.! Lich. Antarct. n.* 6.

HAB. Northern Island: Bay of Islands, *J. D. H.* (On very friable stone.)

Apothecia large, having their circumference free, very pruinose; disc white within, placed on a carbonaceous stratum. Asci elongate, obovate, enclosing about eight sporidia, which are pale green, oblong, inclined to be acuminated at both ends, apparently margined, not septate. The structure of Schærer's specimen is precisely similar; only the pruina is wanting (having been obliterated?) in my copy. Crust in Dr. Hooker's specimen almost obsolete.

b. *Corticolæ.*

8. Lecidea *parasema*, Ach., *Syn. p.* 17. *Fries, Lich. Eur. p.* 330.

HAB. Northern Island; on various barks, probably common, *Colenso, etc.*

To this may perhaps be referred *L. albido-plumbea*, Tayl.! in Hook. Lond. Journ., a form in which the hypo-

thallus preponderates, and which "differs from *L. parasema*, Ach., by its scaly thallus and scattered apothecia." *Tayl. l. c.*

9. Lecidea *disseminata*, Tayl., *Lich. Antarct. n.* 20; "verrucis in substratum tenue nigricans tartareis albidis sparsis subrotundis subrugosis foraminulosis, apotheciis confertis demum immarginatis confluentibus disco rufescenti, lamina pellucida crassa insuper substantiam albam corticalem posita." *Tayl. ut supra.*

HAB. Northern Island, Bay of Islands, *J. D. H.*

"Patch indeterminate; warts of the size of poppy-seeds; apothecia a little larger, their thin border observable only in the young state. It is allied to *Lecanora involuta*, Tayl." *Tayl. l. c.*

Unknown to me, and probably not a true species of *Lecidea.*

10. Lecidea *albido-plumbea*, Tayl.! *Lich. Antarct. n.* 23; "crusta leprosa tenuissima albido-plumbea nigro-limitata, apotheciis sparsis subsessilibus, disco atro-pruinoso margine tenui undulato intus rufescentibus." *Tayl. ut supra.*

HAB. Northern Island: Bay of Islands, on bark, *J. D. H.*

"Patches several inches wide, dull whitish, lead-coloured; thallus, under a lens, appearing broken into very minute whitish scales; apothecia few, scattered, the black shell is continued beneath the lamina, which is a dusky brown." *Tayl. l. c.*

I can make nothing of this plant, which is in an undeveloped state. It may be *L. parasema*, or any other allied species.

C. *Thallo crustaceo, subgranuloso.*

11. Lecidea *abietina*, Ach., var.? *saxicola*, Bab. Pyrenothea leucocephala * Lecidina, *Fries, Lich. Eur. p.* 450?

HAB. Northern Island; on sandstone, almost without crust, *Colenso.*

This plant is probably the same as is mentioned by Mr. Borrer (see Hook. Engl. Fl. vol. v. pt. 1. p. 152), to whom I am indebted for a specimen. I have united it with *L. abietina*, marking at the same time a doubt of the propriety of so doing. Dr. Nylander, in his valuable observations on Swedish Lichens (Ephem. Holm. 1853, Botaniska Notiser, n. 6), affirms that *Pyrenothea leucocephala*, Fries, is *L. abietina* (spermatogonia), and I had also previously intimated such to be my suspicion to Mr. Leighton in a letter, who has figured the spermatozoa as sporidia. (*Ang. Lichenes*, pl. xxviii.) At the same time, there is some confusion about the synonymy of *L. abietina*, and I am not possessed of the requisite materials for unravelling it. (See Leighton, l. c. p. 66.)—The *L. abietina* of British authors grows often on Oaks.

The species of this and the preceding genus can only be properly elucidated by resident botanists.

TRIBE III. *GRAPHIDEÆ.*

Gen. XVII. GRAPHIS, *Ach.*

1. Graphis *scripta*, Ach., *Syn. Lich. p.* 81. Opegrapha scripta, *a, Fries, Lich. Eur. p.* 371.

HAB. Northern Island, on bark, *Colenso.*

Dr. Montagne, as well as myself, is inclined to refer this to the common *G. scripta*, Auctt. Mr. Colenso's specimens substantially agree with Schærer's Exs. n. 90. The species appears universally diffused, "summo septentrione pro more generis excepto" (Fries); with the exception likewise, as it seems, of the extreme south; at least, it is not included in Dr. Hooker's 'Flora Antartica.' The absence of all true *Opegraphæ* from New Zealand is remarkable; probably, however, *O. atra* (if not others) will be found: it occurs at the Cape, as well as all over the northern hemisphere.

Gen. XVIII. LECANACTIS, *Eschw., Fries.*

1. Lecanactis *impolita,* Fries, *Lich. Eur. p.* 377. Parmelia impolita, *ejusd. p.* 183. Arthonia biformis, *Schær.! Exs. n.* 251.

HAB. Northern Island, *Colenso.*

A very difficult species, for which the reader is referred to Fries. We are not fully prepared, however, to assent to his arrangement of the synonyms. Mr. Colenso's specimen agrees with Schærer's published specimen exactly. The geographical range of the present Lichen is probably very extensive; it occurs all over Europe, in the regions of the plains, according to Fries, and is included in Tuckermann's 'Synopsis of North American Lichens.'

Gen. XIX. STIGMATIDIUM, *Meyer.*

1. Stigmatidium *crassum,* Dub., *Bot. Gall. p.* 643. *Moug. et Nest.! Exs. n.* 955. Sagedia aggregata, *Fries, Lich. Eur. p.* 416. *cum syn.* Opeographa crassa, *β* venosa, *Schær.! Exs. n.* 587.

HAB. Northern Island, *Colenso.*

We cannot but agree with our learned friends, Dr. Nylander and Mr. Leighton, in referring this plant to the *Graphideæ.* This plant has hitherto, we believe, been found only in Western Europe.

Gen. XX. ARTHONIA, *Ach.*

This is one of the most unsatisfactory genera of Lichens; imperfect specimens of *Graphis* or *Opegrapha* assume arthonioid forms, and it is a question not yet decided whether any *Arthoniæ* are autonomous species: they produce, however, perfect sporidia.

1. Arthonia *polymorpha,* Ach., *Syn. Lich. p.* 7. *Eschw. in Mart. Ic. Sel. Crypt. Bras. p.* 14. *t.* 9. *f.* 3.

HAB. Northern Island, on bark, *Colenso.*

2. Arthonia? *confluens,* Fée, *Ess. sur les Crypt. des Ec. Off. p.* 55. *t.* 14. *f.* 5. Peziza pruinata, *Schweinitz! Fries, Syst. Myc.*

HAB. Northern Island, on bark, *Colenso.*

I am indebted to my valued friend Dr. Montagne for determining this pretty species; the description and figure of M. Fée (fig. *b.*) accord tolerably well. The crust is rather thick, chalk-white, well defined, with a faint lilac tinge here and there, somewhat pulverulent. In the New Zealand specimens the surface is completely studded over with roundish minute apothecia, whose edges curve inwardly when dry, so as to resemble in some degree a *Verrucaria,* opening irregularly by a pore; when moistened they expand, and show a dark disc; they are covered more or less completely with glaucous pruina, and the general appearance of the plant reminds us more of *Pyrenothea leucocephala,* Fries, than of any European Lichen which we can call to mind. I am tolerably confident that the *Peziza pruinata* of Schweinitz (for a specimen of which I am indebted to Mr. Berkeley) belongs to this plant*.

* Since the above was written, I have received the following communication from the Rev. M. J. Berkeley:—"I have compared your *Arthonia confluens* with the plant of Schweinitz to which you allude, and find no difference microscopically or externally, except that yours is a little larger. It may possibly be the plant of Fée; whether so or not, it is impossible to say without a specimen; but if so, Fée's is no *Arthonia,* but congeneric with Schweinitz's. The Fungi are printed, or I should have had no hesitation in entering it amongst them as a mere form of *Peziza pruinata. Peziza conspersa,* Pers., seems to be something of the same kind."

TRIBE IV. *CALICIEÆ.*

Gen. XXI. CALICIUM, *Pers.*

The numerous and perplexing species of this genus are found almost entirely in Europe and North America, especially in the colder parts of them; we have also *C. sessile* from Madeira, but have no recollection of having seen a specimen collected in the southern hemisphere until Mr. Colenso's plant came to hand. His discovery of this genus and of *Trypethelium* in New Zealand goes to show how exceedingly ubiquitous all the genera of Lichens are, and raises great presumption that this will be found to be the case more and more, as observations are increased. Till comparatively lately *Strigula* was thought to be wholly tropical, but one species (*S. Babingtonii*, Berk.!) is extremely common in many parts of England, and very possibly several may be found on the coriaceous leaves of New Zealand trees and shrubs. *Glyphis* and *Chiodecton* are now also found in Europe, and probably occur in New Zealand.

1. Calicium *curtum*, Turn. et Borr.! *Lichenogr. Brit. p.* 148. *Schær.! Exs. n.* 248 (*not of Fries, according to Schærer, Spicil.* 235).

HAB. Northern Island, on dead wood, *Colenso.*

We believe our Lichen to be identical with Schærer's plant, and with a specimen named by Mr. Borrer; but dare offer no opinion about the synonyms.

SUBORDER II. ANGIOCARPI, *Fries.*

TRIBE I. *SPHÆROPHOREÆ.*

Gen. XXII. SPHÆROPHORON, *Pers.*

1. Sphærophoron *tenerum*, Laur.! *in Linn. v.* 2. *p.* 45. *t.* 1. *f.* 4. *Mont. Voy. au Pôle Sud, Crypt. p.* 172. *Hook. fil.! Fl. Ant. pp.* 195. 530. *t.* 197. *f.* 1.

HAB. Northern and Middle Islands, *Colenso, Lyall, etc.*

Dr. Hooker's remarks on the distinctive characters, the analysis, and the distribution of this plant, leave little more to be said. In its ramification it comes nearest to *S. fragile*, Pers., but is much more slender and delicate; the thick naked branches which bear the apothecia at their summits usually distinguish the plant at first sight, but Dr. Hooker considers the decisive mark between this and *S. coralloides* and *fragile* to lie in the apothecia, "which in the adult state are margined only with the remains of the thallodal border, which afterwards falls away entirely."

2. Sphærophoron *coralloides*, Pers. *Fries, Lich. Eur. p.* 405.

HAB. Northern and Middle Islands, fertile, *Colenso, Bidwill, etc.*

In age, the contents of the apothecia are discharged, and the border only remains. Main stems roundish, thick; upon them are seated coral-like fibres. One of Mr. Colenso's specimens is growing on wood.

3. Sphærophoron *australe*, Laur.! *in Linn. ut supra, p.* 44. *Hook. fil.! Fl. Ant. pp.* 195. 530. (TAB. CXXX. C.)

Var. *β. scrobiculatum*, Bab.; thallo glauco foliaceo dissecto marginibus erosis subtus niveo basi nigricante, podetiis glaucis subcanaliculatis demum explanatis latissimis subnudis passim squamulosis palmatis, ramis subsimplicibus subtus niveis, apotheciis inferis maximis, margine latissimo reflexo lacero supra corrugato scrobiculato.

HAB. Northern Island, *Colenso.* Var. *β.* Northern and Middle Islands, *Colenso, Lyall.* (Growing on earth, with quartz grains.)

A troublesome species, several of whose forms are well described by Dr. Hooker (as above). The apothecia of this and the following species are inferior, and have their margins reflexed. One of Mr. Colenso's specimens

grows on the dead stem of some Fern. Mr. Bidwill's plant (barren) is on the trunk of a tree, and suffused here and there with a pinkish hue beneath, somewhat resembling in general appearance small states of *Evernia prunastri*, Ach.—The var. β (to which the large figure in the plate belongs) is a remarkable form, but connected with the type by intermediate states. The thallus at the base is very conspicuous, and may be compared to that of *Cladonia alcicornis* or *cervicornis;* it is irregularly divided and dissected; a few smaller scales are scattered over the otherwise naked podetia: these last are at first channelled, then explanate, very broad, half an inch or more, divided or rather split in a palmated manner into three or four subcanaliculate branches, with margins occasionally subspinulose; upper surface glaucous, scarcely at all corrugated, except at their fertile extremities, where they are very deeply pitted; under side slightly corrugated, white, blackish towards the base, with an occasional buff tinge. Apothecia inferior, very large above, $\frac{7}{10}$ of an inch wide in the largest specimen, including the margins, the disc itself being nearly $\frac{1}{2}$ an inch. The margin is in age much corrugated below, snow-white, irregularly split and erose at the edges, not uniform in breadth, but widest at the upper extremity, *i.e.* at the termination of the branch of the podetium.—PLATE CXXX. C. Figs. 1–4, various states, *natural size;* 5, vertical section of podetium and apothecium; 6, portion of apothecium; 7, immature, and 8, mature asci; 9 and 10, sporidia; 11, gonidia:—*all highly magnified.*

4. Sphærophoron *compressum*, Ach. *Fries, Lich. Eur. p.* 404.

HAB. Northern and Middle Islands, *Colenso, Bidwill, etc.*

This species has a good deal of the ramification of *S. coralloides*, but the structure and position of the apothecia are the same as in the preceding species.

With respect to the geographical distribution of this genus, the species affect the frigid and temperate zones of both hemispheres, but I am not aware that they have been found within the tropics, though *S. coralloides* occurs in the Canary Islands. The three European species are also found in the south, to which *S. tenerum* and *S. australe* (of which *S. insigne*, Laur.! is probably a form) are exclusively confined. See more minute particulars in Hooker, as above.

A singular state (barren) of some species of *Sphærophoron* (as it seems) has been collected by Mr. Colenso in the Northern Island and at Port Nicholson, by Dr. Lyall. The stems are terete, coal-black below and polished, or else of a velvety consistence, ferruginous above, flaccid; the branches are very much divided, and end in numerous glaucous purplish flaccid capillary branchlets, which are decompounded in a remarkable degree. The whole plant has a dark lurid appearance, and is evidently a morbose condition of some other Lichen, perhaps of *S. tenerum*, Laur.

TRIBE II. *ENDOCARPEÆ.*

Gen. XXIII. TRYPETHELIUM, *Ach.*

1. Trypethelium *madreporiforme*, Eschw.; crusta subcerata nitidiuscula flavo-virente, stromate subgloboso extus duriusculo brunneo intus luteo, apotheciis circa ostiolum denudatis a verruca elevato-marginatis.—*Eschw. in Mart. Ic. Sel. Crypt. Brasil. p.* 19. *t.* 9. *f.* 6. *Mont.! Ann. des Sc. Nat. t.* 19. *p.* 68 (*ser.* ii.); *ejusdem Crypt. Guyan. n.* 212. *in Ann. des Sc. Nat. t.* 16. *p.* 70. (*ser.* iii.) *Paullulum differt Lichen N. Zelandiæ,*

Var. *β. obscurius,* Bab.; crusta erumpente albida subpapillata deinde evanescente, stromate intus subfusco.

HAB. Northern Island, on aged bark, *Colenso.*

Except in the nature of the crust and the internal colour of the stroma (which is possibly due to age, or perhaps to a more temperate climate), Mr. Colenso's Lichen agrees with Eschweiler's figure, and with a specimen from Dr. Montagne gathered by M. Leprieur in French Guiana. Mr. Spruce has also collected it on the banks of the Amazon, but we are not aware of this Lichen having been hitherto found, except in tropical America, to which

region indeed the genus seems to be principally confined, so far as present observations have been made. One or two species, however, occur in India, and it is probable that others may be found throughout the tropical and subtropical regions of the globe.

Gen. XXIV. ENDOCARPON, *Ach.*

1. Endocarpon *pusillum*, Hedw., *Fries, Lich. Eur. p.* 411. E. Hedwigii, A, *Schær.! Lich. Helv. Exs. n.* 115.

HAB. Northern Island, *Colenso.* On the ground, with *Parmelia fulgens* and *Biatora decipiens.*

2. Endocarpon *fluviatile*, DC. *Fries, Lich. Eur. p.* 409.

HAB. Northern Island, *Colenso.*

Very indifferent specimens, but no doubt belonging to this species.

In this genus we again find our common British Lichens, re-appearing at the antipodes; the species of *Endocarpon* are principally found in the temperate and polar regions, but also (*E. æquinoctiale*, Hochst.!) in the neighbourhood of the equator at high altitudes.

Gen. XXV. PERTUSARIA, *DC.*

1. Pertusaria *communis*, DC. *Fries, Lich. Eur. p.* 420.

HAB. Northern Island, both on bark and stones, *Colenso, Raoul, etc.*

Occurring under various forms, among which is *P. leioplaca*, Ach., and several states which would have been called *Variolariæ* by Acharius.

It is probable that several species of this genus occur in New Zealand; minute fragments of a form unknown to Dr. Montagne as well as to myself, have been collected on stone by Colenso. The warts are extremely thick, smooth, and confluent, and the plant can hardly perhaps be a state of any described species; but it would be imprudent, in so difficult a genus, to construct a new species out of such imperfect materials. *P. communis* is ubiquitous within the temperate regions.

Gen. XXVI. PORINA, *Ach.*

1. Porina *cucurbitula*, "Mont., *Fl. Chil. ined. c. ic.*" *Mont.! in litt.* Pertusaria cucurbitula, *ejusd. Diagn. Phycol. n.* 15. *in Ann. des Sc. Nat. v.* 18. *ser.* iii. (*by a misprint for* Porina ?)

HAB. Northern Island, on bark, *Colenso.*

A remarkable plant, unlike any species with which I am acquainted, but which, if casually inspected, might be taken for a small form of *Pertusaria communis. Hypothallus* filmy, white and silvery. *Crust* somewhat radiating, orbicular, patches confluent and spreading widely over the bark on which it grows, cream-coloured, warty. *Apothecia* very numerous, smallish, sessile on the crust, prominent, subconfluent, of the same colour as the thallus, at first closed, then expanding and margining the single apiculated nucleus which they enclose. *Nucleus* waxy within, at length falling away, leaving the excipulum empty and wax-coloured at the bottom.—I am indebted to my excellent friend Dr. Montagne for determining this plant. *Porina* differs from *Pertusaria* "par des verrues uniloculaires," as he observes in his description of *Porina endochrysa;* consequently the present Lichen is a *Porina.*

2. Porina *endochrysa*, Mont.! *Cent.* 3. *n.* 98; *ejusd. Crypt. Guy. n.* 229. (TAB. CXXVIII. D.)

HAB. Northern Island, *Colenso.*

Dr. Montagne confirms my supposition that this Lichen is his *P. endochrysa.* The under side of the plant is studded with buff pilules, which are produced by the protuberant bases of the apothecia. *Sporidia* $\frac{1}{200}$ of an inch long, *muralia*, as Flotow would call them, *i.e.* containing irregular dissepiments, pressing irregularly against

each other like stones in a wall.—Plate CXXVIII. D. Fig. 1, plant, *natural size;* 2, upper, and 3, under surface of thallus; 4, vertical section of apothecium; 5, immature, and 6, mature asci; 7 and 8, sporidia:—*all highly magnified.*

Tribe III. *VERRUCARIEÆ.*

Gen. XXVII. VERRUCARIA, *Ach.*

An extensive genus, occurring in all parts of the world, the species of which are very ill understood, partly in consequence of the extreme minuteness of many of them. The sporidia of the British species are figured by Leighton in his British Angiocarpous Lichens.

1. Verrucaria *nitida,* Schrad. *Fries, Lich. Europ. p.* 443.

Hab. Northern Island, Bay of Islands, on bark, *J. D. H.*

A variable species in New Zealand, as well as in Europe. The form *nitidella,* Flörke, likewise occurs in New Zealand.

2. Verrucaria *alba?,* Schrad. *Fries, Lich. Eur. p.* 444. V. dermatodes, *Tayl.! Lich. Antacrt. n.* 27 (not Borr.! which Leighton rightly determines to be a form of *V. nitida,* Ang. Lich. p. 36.)

Hab. Northern Island, Bay of Islands, on bark, *J. D. H.*

I am not at all satisfied that I have determined this species correctly. Mr. Leighton has kindly examined the sporidia, which he finds not unlike those of *V. nitida.*

3. Verrucaria *immersa,* Pers. V. rupestris, *Fries, Lich. Eur. p.* 436 (*in part*).

Hab. Northern Island, on calcareous stone, *Colenso.*

4. Verrucaria *umbrina,* Wahl. *Fries, Lich. Eur. p.* 441.

Hab. Northern Island, *Colenso.* On pebbles, in a bad state, almost without a crust.

5. Verrucaria *muralis?,* Ach., *Syn. p.* 95. *Fries, Lich. Eur. p.* 436. *Schær.! Exs. n.* 441.

Hab. Northern Island, on sandstone, *Colenso.*

Perithecia entire in Mr. Colenso's specimen.

6. Verrucaria *maura,* Wahl. *Fries, Lich. Eur. p.* 442.

Hab. Northern Island, *Colenso.*

The stones on which this grows have evidently been suffused by sea-water, consequently there is not much doubt that the specimens are correctly named.

There is no question that this enumeration of the *Verrucariæ* of New Zealand is incomplete; probably many other species occur.

Suborder III. BYSSACEÆ.

Tribe I. *COLLEMACEÆ.*

Gen. XXIX. LEPTOGIUM, *Fries.*

1. Leptogium *Brebissonii?,* Mont.! *in Webb et Berth. Hist. Can. p.* 130. Collema ruginosum, *Duf. Hb. Schær. Enum. Crit. p.* 251. C. rugatum, *Tayl.! Lich. Antarct. n.* 143. *ut supra.* Stephanephorus Dufourianus, *Bab. olim in sched. cum Lich. Pyren. Spruc. divulgatis.*

Hab. Northern Island; on trees, barren, Bay of Islands, *J. D. H., Sinclair.*

A handsome species, easily known (when fertile) from most of its allies by the elevated plicæ and striations of

the thallus, and well described by the authors above referred to. Mr. Spruce observes of it:—"Near Jurançon there is a *Collema* on the trees which is quite meteoric; in wet weather, and especially after thunderstorms, it springs up as suddenly as a mushroom, forming globular tremelloid masses, covered with apothecia. Léon Dufour has observed the same near St. Séver, but has never been able to determine it satisfactorily." The habit of the thallus is that of some species of *Stephanephorus* of Flotow, a genus which can hardly be considered valid; but the apothecia are externally furfuraceous, not foliaceous. This species, long undescribed, occurs in Ireland (Taylor!), Wales (Salwey!), Western France (Spruce! etc.), the Canaries (Lemann! etc.), and Madeira (Salwey!), as well as in New Zealand.—*C. chloromelum*, Ach., Mont. Crypt. Cub. c. ic., is perhaps too near this species.

2. Leptogium *tremelloides,* Fries, *Summ. Veg. Scand. p.* 122. Collema tremelloides, *Ach. et Auctt.* C. cyanescens, *Schær.! n.* 409. L. azureum, *Mont.!* (Collema azureum, *Ach. et Auctt.*).

HAB. Abundant throughout the Islands, fertile, *Colenso, etc.*

We cannot but consider *L. azureum*, with Eschweiler, as merely a more brilliantly coloured form of this species; it is well figured by Swartz, Lich. Amer. t. 15, and Fée, Essai, t. 2. This Lichen is almost, if not quite, a cosmopolite, the azure form belonging principally to the tropics, but occurring also in New Zealand and elsewhere. It is found as far north as Sweden, and as far south as Cape Horn, and in numberless intermediate localities, but the fertile state occurs principally or entirely in warmer climates.

3. Leptogium *scotinum,* Fries, *ut supra.* Collema sinuatum, *Schær.! Enum. Crit. p.* 250. *Exs. n.* 405.

HAB. Northern Island, barren, *Colenso.*

The specimens agree substantially with the European form. We can scarcely, however, think this Lichen distinct from the very polymorphous *L. lacerum*, Fr. Schærer had originally united them, but in his last work he considers them distinct. *C. scotinum* occurs all over Europe, as far north as Lapland, and in the Canary Islands, but is absent from the North American Enumeration of Tuckermann; I suspect, however, that it occurs pretty generally throughout the world. *C. lacerum*, at all events, occurs in the New World both within and without the tropics.

Gen. XXX. COLLEMA, *Hoffm. pr. p., Fries.*

The genus *Leptogium* is distinguished from *Collema*, by Fries and others, by its proper excipulum and diaphanous thallus; but the membranaceous division of *Collema* has the margin of the apothecia so nearly of the same colour as the disc, that we fear no very strict limits can be drawn between them. In truth, the genera of Lichens are almost ideal: in practice we have numerous instances of plants which are ambiguous between two or more genera.

1. Collema *nigrescens,* Ach. et Auctt.

Var. *β. leucocarpum,* Bab.; apotheciis roseis pruinosis demum expallentibus.—C. leucocarpum, *Tayl.! Lich. Antarct. n.* 144.

HAB. Middle Island, *D'Urville.* Var. *β.* Northern Island, *Colenso.*

Mr. Colenso's specimens do not agree with the typical European form (*i. e., a, Vespertilio*, Schær.! Enum. Crit. p. 252; Exs. 410), which we have not seen from New Zealand, but are to be referred to our var. *leucocarpum.* This beautiful form has been also gathered by Mr. Gunn in Van Diemen's Land, and in Scotland by Captain Carmichael. The thallus agrees with *C. nigrescens*, and the apothecia alone differ; but the characters, though giving the plant a striking appearance, appear to be unimportant. *C. nigrescens* is found all over Europe, as far north as Lapland; we have it from Madeira (Salwey!), also from the United States (Greene!), where it occurs in various localities (Tuckermann), and from the Himalaya Mountains (Winterbottom!), and Madras (Wight!). In the south, however, it seems less frequent.

2. Collema *flaccidum*, Ach. et Auctt.

Var. *β. læve*, Bab.; lobis amplis submonophyllis appressis, thallo lævi subrigido concavo atro-viridi, apotheciis valde confertis rufo-fuscis evidenter marginatis.—C. læve, *Tayl.! Lich. Antarct. n.* 142.

Var. *γ. cærulescens*, Bab.; thallo amplo valde rigido granulis nullis, lobis ascendentibus colore viridi subazureo demum dilutius flavescente, apotheciis numerosissimis evidenter marginatis, disco rufo.

Hab. Northern Island, *Colenso*. Var. *β*. Bay of Islands, on trees, *J. D. H.* Var. *γ*. On trees, *Colenso*.

Mr. Colenso's specimens of the type, which are barren, and grow both on rocks and on wood, agree well with the European forms; the thallus is thin, dull green, much lobed, and crisped; lobes ascending, more or less covered in many parts with furfuraceous granulations; those on wood may be considered identical with Schær.! Exs. n. 413 (*P. rupestris, β furva*, b *granulosa*). If this is correctly referred to *C. furvum* of Acharius, it hardly seems to be anything more than a variety of *C. flaccidum*. Fries, however, distinguishes them in his Summa Veg. Scand. p. 122. Eschweiler (Fl. Brasil. p. 234) speciously enough combines this with the preceding, and it is indeed often difficult to distinguish indifferent specimens; the structure, however, of the under side of *C. nigrescens*, as well as a certain habit, seem to indicate a specific difference; but I must own myself to be doubtful on the point. The present species is found all over Europe, from Lapland (Fries) southwards, thence as far as Madeira (Salwey!), in Arctic America (Drummond!), in the United States of North America (Tuckermann), in Brazil (Eschweiler), and probably in many other regions of the south.

The var. *læve*, Bab., has the lobes of the ample submonophyllous appressed thallus quite smooth, rather rigid, concave, dull green; apothecia minute, very crowded, rufo-fuscous, distinctly margined.

This variety is compared with *C. nigrescens* by Taylor, who remarks that the lobes are thinner, smoother, without longitudinal wrinkles, and that the apothecia in all stages are concave, with a thicker thallodal cup. This absence of wrinkles indicates the affinity to be with *C. flaccidum*, and it appears to be merely a handsome ample form, void of granulations; the apothecia, however, are very densely crowded, as in *C. nigrescens*.

The var. *cærulescens* differs from the preceding in its greater rigidity and brighter colours. Neither of these forms at all deserve the name of *C. flaccidum*, but the synonym *C. rupestre* is still less applicable. It is not impossible that this and the preceding variety may be distinct both from *C. flaccidum* and *C. nigrescens*; but there are no very satisfactory characters, and both species are known to be extremely variable.

3. Collema *saturninum*, Ach. et Auctt.

Hab. Northern Island, on bark, *Colenso*.

A variable species, in general easily recognized by the tomentose under side; but this character is almost obsolete in the Antarctic specimens from Cape Horn, which we conceive, notwithstanding, to belong to this species. *C. saturninum* is found at the Cape of Good Hope, and throughout the whole of Europe, likewise in the United States and in Arctic America, and in the Himalaya Mountains. I am not aware whether it occurs within the tropics.

4. Collema *fasciculare*, var. *Colensoi*, Bab.; thallo suborbiculari centro affixo rigido tenui cartilagineo, sicco læte azureo demum discolore, madido turgescente virescente, lobis liberis utrinque concoloribus subrugosis rotundatis sinuatis crispatis, apotheciis stipatissimis totos margines obtegentibus minutis subimmarginatis rufis.

Hab. Northern Island, on twigs, *Colenso*.

Perhaps a distinct species. In the disposition of the apothecia it much resembles *Leptogium marginellum*, Mont.! (*Collema*, Ach. et Auctt.); but the present plant, although the apothecia have no very distinct thallodal margin, is evidently a *Collema*, the thallus being much too thick for a *Leptogium*, and decidedly swelling when moistened. It grows in small tufts about an inch in diameter, more or less, bright blue at first, but in age assuming a disagreeable greenish-brown tint, with the lobes freely ascending from the centre, thus giving the species more of the habit of a *Gyrophora* than is usual in this genus. These lobes are very numerous, extremely crisped and sinuated,

having their margins completely beset with a crowded mass of minute rufous apothecia, which become darker in age. When moistened, the plant becomes dull green, pale and pellucid. I am unwilling to separate this from *C. fasciculare*, Borr.!, but other specimens so named (*e.g.* Schær.! n. 415) are evidently something very different. The present plant certainly does not belong to *C. nigrescens*.

5. Collema *pulposum?*, Schær.! *Enum. Crit. p.* 258. *t.* x. *f.* 5; *Exs. n.* 428–431. C. crispum, *Engl. Bot. t.* 834. C. cristatum, *Borr.*

HAB. Northern Island, on the ground, barren, *Colenso*.

The determination of an indifferent barren specimen cannot be regarded as certain in so difficult a genus as this is; but there is no reason to suppose it to be anything different from the common European species.

Besides the above, I have seen some specimens of *Collemata* from New Zealand, which I am unable to determine with satisfaction.

TRIBE II. *MYRIANGIACEÆ.*

Gen. XXXI. MYRIANGIUM, *Berk. et Mont.*

Thallus orbiculatus, tuberculatus, aut inæquabilis, ambitu plicato-striatus, gelatinosus, atro-fuscus, intus pallescens. Apothecia imperfecta tuberculiformia, immarginata, perfecta vero scutelliformia a thallo marginata, primo clausa dein aperta thalamium includentia crassum concolor fuscum.

For a more detailed account of this obscure and singular genus, see Hook. Lond. Journ. of Bot. vol. iv. p. 72. Ann. des Sc. Nat. t. xi. (ser. iii.) p. 245.

1. Myriangium *inconspicuum*, Bab.; thalli pulvinulis minutis subpapillatis glabris (fere 1 lin. latis) subglobosis, apotheciorum disco subrufo inconspicuo subimmarginato, sporidiis minutissimis oblongis uniseptatis. (TAB. CXXVIII. B.)

HAB. Northern Island; on dead leaves, apparently of *Phormium tenax*, *Colenso*.

A very much smaller species than *M. Duriæi*, Berk.! et Mont.!, and in Mr. Berkeley's opinion quite distinct from it. He finds the sporidia to be $\frac{1}{1000}$ of an inch long in the present plant, oblong, constricted a little towards the middle, and uniseptate. The disc of the apothecia is not without difficulty to be distinguished from the thallus; that which may be considered such is very obscurely margined by the thallus, and of a rufous tinge, and is possibly imperfect. Both *M. Duriæi* and *M. Curtisii*, Berk.! et Mont.!, have a much more depressed as well as larger thallus. I could have wished to have seen more and better specimens of this plant, but was loth to omit mention of it altogether. The most perfectly developed species of the genus (*M. Curtisii*) occurs in North America, another (*M. Duriæi*) in Algiers, and the same, as it seems, occurs in France and the Channel Islands (Salwey!); a third is found in Australia.—PLATE CXXVIII. B. Fig. 1, plant, *natural size;* 2, apothecia; 3, vertical section of ditto; 4, asci; 5, sporidia:—*all highly magnified.*

TRIBE III. *CŒNOGONIEÆ.*

Gen. XXXII. CŒNOGONIUM, *Ehrenberg.*

1. Cœnogonium *Linkii*, Ehr. *in Nees Hor. Phys. Berol. pp.* 119–122. *t.* 27. *Mont.! Crypt. Guyan. n.* 77. *Fée, Essai. t.* 2.

HAB. Northern and Middle Islands; fertile, *Colenso*, *D'Urville*.

Found in the West Indies (Montagne!), Guiana (Montagne!), Cumana and Peru (Humboldt), Brazil (Ehrenberg), the Ladrone Islands (Gaudichaud), Van Diemen's Land (Gunn!), and New Holland (Sieber!). I have also a barren fragment from the Mauritius.

TRIBE IV. *LICHINEÆ.*

Gen. XXXIII. LICHINA, *Ag.*

1. Lichina *pygmæa*, Ag., *Sp. Alg. v.* 1. *p.* 105. *Alg. Danmon. Exs. n.* 155.

Var. *intermedia*, Bab.; ramis planiusculis tenuioribus, statura minore. (TAB. CXXVIII. C.)

HAB. On the rocks, Otago, fertile, March, *Dr. Lyall.*

This appears to be almost identical with the European form. Branches short, densely tufted, firm, flattish, branched and forked, blunt at the tips; in stature intermediate between *L. pygmæa* and *L. confinis* (which are perhaps too near one another), but the characters are rather those of the former. Dr. Harvey is disposed to consider this a new species, but I can hardly venture to propose it as such.—PLATE CXXVIII. C. Fig. 1, plant, *natural size;* 2, branch; 3, vertical section of ditto; 4, transverse section of ditto; 5, apothecia; 6, the same, cut vertically; 7, sporidia; 8, cells of the thallus:—*all highly magnified.*

APPENDIX I.

SYNOPSIS OF THE NATURAL ORDERS AND GENERA OF NEW ZEALAND PLANTS.

In the prefatory remarks to the 'Flora of New Zealand,' p. 2, I proposed appending to this work a synopsis of the New Zealand Natural Orders: and to this I have, upon further consideration, added a synoptical table of the genera also, arranged according to the artificial or Linnæan system. My object in this is to facilitate the reference of many of the obscure genera to their proper places, and by no means to obviate the necessity or to supersede the use of a sound elementary acquaintance with the Natural Orders, as illustrated in the books which I have mentioned in the Preface as necessary to be studied. An accurate knowledge of the Natural System is indeed the foundation of botany; but to acquire it through the study of New Zealand plants is extremely difficult, owing to those peculiarities of the flora dwelt upon at p. xxviii. of the Introductory Essay; and I have therefore availed myself of artificial characters in the following attempt so to group and define the Orders and Genera, that the student may, at any rate in some cases, provided he proceeds with care, be able to refer even the most obscure New Zealand plant to its genus.

It is assumed that the student who intends availing himself of these Keys has mastered the rudiments of botany, and consequently understands the structure of Grasses, of *Compositæ, Coniferæ, Orchideæ*, etc.; there are, however, besides these, certain genera of curious or anomalous structure whose place in the system could hardly be found out by the beginner, but which may easily be recognized after reading their descriptions; as *Viscum, Euphorbia, Ruppia, Zannichellia, Freycinetia, Gunnera, Callitriche, Piper, Peperomia, Lemna*, and others. It would be impossible for any one who was not both an experienced botanist and dissector to find out the names of these genera and to understand their affinities; and as it is not to be expected that an unaided student can do so, they should be sought for in their appropriate localities, studied, and preserved in the herbarium.

I would here impress upon the beginner the importance of keeping an Herbarium, which is the library of the botanist as well as his museum. This he should regard as the foundation and depository of his knowledge and experience; it should, as far as possible, embody all the information he possesses in the shape of notes, descriptions, and sketches, and it should contain not only specimens to look at, but plenty of spare flowers, fruits, seeds, etc., for re-examination and dissection; varieties, monsters, and all structural and morphological anomalies should be so preserved in it that their peculiarities may at once be perceived; for these are necessary to be understood, and are instructive even to persons who are not interested in systematic botany. It must be remembered that the great value of a good herbarium does not depend upon its being the means of readily naming a plant (though that is a most important one), but upon the information it conveys respecting each individual contained in it as a member of the vegetable kingdom, the area and conditions to which it is confined, and the variations to which it is subject: it should present, in short, as far as possible, a history of the species in the widest acceptation of the term.

The student must bear in mind that the following Keys are very imperfect. I have not the requisite familiarity with New Zealand plants in all their forms to enable me to offer them as anything but attempts, and can only repeat what I have before said (p. 5) with regard to native names, that if they lead to the determination of one difficult plant out of five, their object will be answered to my satisfaction.

I. KEY TO THE NATURAL ORDERS.

CHIEFLY ADAPTED FROM DR. LINDLEY'S 'VEGETABLE KINGDOM.'

Exogens, or Dicotyledones.

I. POLYPETALOUS.

A. Polyandrous. Stamens more than 20.
- § Ovaries inferior.
  - 1. Leaves with transparent dots . *Myrtaceæ.*
  - 2. Leaves without transparent dots . . . . *Mesembryanthemeæ.*
- §§ Ovaries superior.
  - † Leaves stipulate.
    - a. Carpels free . . . . . *Rosaceæ.*
    - β. Carpels combined.
      - 1. Anther 1-celled . . . *Malvaceæ.*
      - 2. Anther 2-celled . . . *Tiliaceæ.*
  - †† Leaves exstipulate.
    - a. Carpels numerous.
      - 1. Stamens perigynous . . *Rosaceæ.*
      - 2. Stamens hypogynous, free *Ranunculaceæ.*
      - 3. Stamens hypogynous, united in bundles . . . . *Hypericineæ.*

B. Oligandrous. Stamens fewer than 20.
- § Ovary inferior.
  - † Flowers umbellate.
    - 1. Herbs. Styles 2 . . . *Umbelliferæ.*
    - 2. Shrubs or trees. Styles 2 or more. . . . . *Araliaceæ.*
  - †† Flowers not umbellate.
    - a. Stipulate . . . . *Rhamnaceæ.*
    - β. Exstipulate.
      - * Style 1.
        - 1. Petals 4, imbricate. . *Onagrarieæ.*
        - 2. Petals 4–5, valvate. Stam. opposite petals . *Loranthaceæ.*
        - 3. Petals 5. Stamens alternate with petals.
          - Cells of fruit 1-seeded *Corneæ.*
          - Cells of fruit many-seeded. . . . . *Escallonieæ.*
      - * Styles 2 or more.
        - 1. Cells of fruit 1-seeded . *Halorageæ.*
        - 2. Cells of fruit many-seeded . . . . . *Saxifrageæ.*
- §§ Ovary superior.
  - † Leaves stipulate.
    - a. Carpels solitary or distinct.
      - 1. Flowers papilionaceous . *Leguminosæ.*
      - 2. Flowers regular . . . *Rosaceæ.*
    - β. Carpels more or less combined.
      - * Placentæ parietal.
        - 1. Flowers with a corona *Passifloreæ.*
        - 2. Leaves with viscid glandular hairs . . . *Drosera.*
        - 3. Connective of anthers broad . . . . . . *Violarieæ.*
      - ** Placentæ axile.
        - 1. Styles separate.
          - Sepals free . . . . *Elatineæ.*
          - Sepals combined . . *Cunoniaceæ.*
        - 2. Styles combined; carpels gynobasic. .
          - Carpels awned . . *Geraniaceæ.*
          - Carpels not awned . *Oxalideæ.*
        - 3. Styles combined; carpels not gynobasic.
          - Sepals 2–3 . . . . *Portulaceæ.*
          - Sepals 5. . . . . *Rhamnaceæ.*
  - †† Leaves exstipulate.
    - a. Carpels several, free.
      - 1. Many-seeded . . . . *Crassulaceæ.*
      - 2. One-seeded . . . . . *Ranunculaceæ.*
    - β. Carpel solitary.
      - 1. Drupaceous . . . . *Anacardiaceæ.*
      - 2. Leguminous . . . . *Leguminosæ.*
    - γ. Carpels combined.
      - * Styles free.
        - 1. Carpels several . . . *Lineæ.*
        - 2. Carpels 2. Shrubs . *Cunoniaceæ.*
        - 3. Carpels 2–3. Herbs . *Saxifrageæ.*
        - 4. Carpel 1. Stamens opposite petals . . . *Olacineæ.*
      - ** Styles combined.
        - 1. Leaves dotted. Stamens alternate with petals . . . . . *Rutaceæ.*
        - 2. Stamens attached within a tube . . . . *Meliaceæ.*

3. Carpels 5. Stam. free *Brexiaceæ.*
4. Carpels 2. Stamens free . . . . *Pittosporeæ.*
5. Leaves dotted. Stamens opposite petals . *Myrsineæ.*

II. Monopetalous.

§ Ovary inferior.
† Flowers in an involucrate head *Compositæ.*
†† Flowers not in an involucrate head.
a. Anthers syngenesious . . *Lobeliaceæ.*
β. Anthers free.
* Stamens 2, forming column with style . . . *Stylideæ.*
** Stamens 5. Stigma indusiate . . . . . . *Goodenieæ.*
** Stamens 4–5. Stigma not indusiate.
1. Leaves opposite or whorled, stipulate. . *Rubiaceæ.*
2. Leaves opposite, exstipulate . . . . . *Caprifoliaceæ.*
3. Leaves alternate . . *Campanulaceæ.*
§§ Ovary superior; flowers regular.
† Ovary 3–4-lobed to the base.
1. Stamens hypogynous . . *Stackhousieæ.*
2. Stamens epipetalous, equal. *Boragineæ.*
3. Stamens epipetalous, didynamous . . . . *Labiatæ.*
†† Ovary not 3–4-lobed.
a. Corolla lobes plicate in bud. Leaves alternate.
1. Capsule few-seeded . . *Convolvulaceæ.*
2. Berry many-seeded . . *Solaneæ.*
β. Corolla lobes twisted in bud. Leaves opposite.
1. Climbing, shrubby . . *Apocyneæ.*
2. Herbs, with bitter roots . *Gentianeæ.*
γ. Corolla lobes imbricate or valvate.
* Stamens epipetalous.
× Leaves opposite.
1. Anthers with pores *Ericeæ.*
2. Stamens two . . . *Scrophularineæ.*
3. Stamens 5. Capsule many-seeded . . *Loganiaceæ.*
4. Fruit 4-lobed . . . *Verbenaceæ.*
×× Leaves alternate.
1. Stam. opposite petals . *Myrsineæ.*
2. Shrubs. Stam. altern. with petals, 2-valved . *Myoporineæ.*
3. Anthers with pores . *Ericeæ.*
4. Stamens alternating with scales . . . . *Sapotaceæ.*
5. Herbs. Capsule dehiscing horizontally . *Plantagineæ.*
6. Anthers 1-celled . . *Epacrideæ.*
** Stamens hypogynous . . *Epacrideæ.*
§§§ Ovary superior. Flowers irregular.
† Ovary 4-lobed to the base.
1. Lip of corolla superior . . *Labiatæ.*
2. Lip of corolla inferior . . *Verbenaceæ.*
†† Ovary not 4-lobed.
1. Leaves with glandular dots *Myoporineæ.*
2. Leaves opposite. Placentæ parietal, involute . . . . *Cyrtandreæ.*
3. Leaves opposite. Placentæ axile. . . . . *Scrophularineæ.*
4. Placentæ central . . . . *Lentibularineæ.*

III. Apetalous.

§ Achlamydeous.
† Leaves stipulate, opposite . . *Chloranthaceæ.*
†† Leaves exstipulate, broad, penninerved.
1. Herbs, juice milky . . . *Euphorbiaceæ.*
2. Flowers minute, in catkins . *Piperaceæ.*
3. Water herbs, with opposite leaves . . . . *Callitriche.*
††† Leaves exstipulate, small, and subulate; or, if large, with parallel nerves. Wood with glandular discs . . . . . . *Coniferæ.*
§§ Monochlamydeous.
† Ovary inferior.
a. Trees or shrubs.
1. Leaves opposite . . . *Loranthaceæ.*
2. Leaves alternate . . . *Santalaceæ.*
β. Herbs.
1. Embryo straight . . . *Halorageæ.*
2. Embryo curved . . . *Tetragonia.*
†† Ovary superior.
a. Leaves stipulate.

1. Shrubs. Petals valvate . *Rhamneæ.*
2. Stipules ochreate . . . *Polygoneæ.*
3. Filaments elastic . . . *Urticeæ.*

β. Leaves exstipulate.

* Flowers hermaphrodite.

× Styles 2 or more, wholly free.

1. Seed solitary . . . *Sclerantheæ.*
2. Seeds many . . . *Colobanthus.*

×× Styles solitary or combined.

‡ Carpels many, free . *Ranunculaceæ.*

‡‡ Carpel one, or several combined.

o Stamens not on perianth.

1. Seed 1. Cotyledons straight . . *Urticeæ.*
2. Seed 1. Cotyledons folded . . *Nyctagineæ.*
3. Seed 1. Embryo curved . . . . *Amaranthaceæ.*
4. Seeds several . . *Chenopodiaceæ.*

oo Stamens on perianth.

1. Four, opposite its segments . . . *Proteaceæ.*
2. Alternate with its segments . . . *Thymeleæ.*
3. In two rows . . *Lauraceæ.*

** Flowers unisexual.

1. Herbs . . . . . . *Chenopodiaceæ.*
2. Trees. Leaves altern. *Lauraceæ.*
3. Trees. Leaves opposite . . . . *Monimiaceæ.*
4. Leafless, twining . . *Cassytha.*

Endogens, or Monocotyledones.

I. Flowers with distinct perianth of six pieces in two rows.

A. Flowers irregular, gynandrous . . *Orchideæ.*

B. Flowers regular.

† Perianth superior, petaloid or herbaceous.

1. Anthers extrorse, or versatile . *Irideæ.*
2. Anthers introrse . . . . . *Hypoxideæ.*

†† Perianth inferior, petaloid, or herbaceous.

* Fruit a few-seeded 1–3-celled berry.

1. Testa pale, membranous . *Smilaceæ.*
2. Testa black, brittle . . . *Liliaceæ.*

** Fruit a 1-seeded drupe . . *Palmeæ.*

*** Fruit a many-seeded capsule *Liliaceæ.*

**** Fruit of 3–6 one-seeded carpels . . . . *Naiadaceæ.*

††† Perianth inferior, glumaceous.

1. Anthers 2-celled. Fruit capsular . . . . *Junceæ.*
2. Anthers 1-celled. Fruit an utricle . . . . *Restiaceæ.*

II. Flowers naked, or with irregular or incomplete perianth, not glumaceous.

A. Flowers arranged on dense long spike or spadix.

1. Climbing shrub . . . . . . *Freycinetia.*
2. Erect water-plants.
   Flowers spiked . . . . . *Triglochin.*
   Catkin cylindrical . . . . *Typha.*
   Catkin spherical . . . . . *Sparganium.*
3. Floating or submerged water-plants . . . . *Naiadeæ.*

B. Flowers not on a spadix, perianth 0, or a small 1-valved spathe.

1. Minute floating fronds. . . . *Lemna.*
2. Leafy water herbs. Peduncle long, twisted. . . . . *Ruppia.*
3. Leafy water herbs. Peduncle short . . . . *Zannichellia.*
4. Tufted herbs. Anther 1-celled . *Restiaceæ.*

III. Perianth incomplete, glumaceous, of one or more scales.

1. Stems solid. Sheaths of leaves split . . . . *Restiaceæ.*
2. Stems solid, 3-angled. Sheaths entire . . . . *Cyperaceæ.*
3. Stems hollow, terete. Sheath split *Gramineæ.*

II. KEY ADAPTED TO THE LINNÆAN METHOD.

I. MONANDRIA. *Stamen 1, in the same flower as the pistil.*

1. Tufted herb, with opposite leaves . *Scleranthus.*
2. Leafless, fleshy, jointed, seaside herb . . . . *Salicornia.*
3. Minute, floating, scale-like fronds . *Lemna.*

4. Minute tufted herb, with alternate subulate leaves . . . . *Alepyrum.*

II. Diandria. *Stamens 2, in the same flower as the pistil.*

1. Calyx inferior or none.
   - A. Dichlamydeous.
     - 1. Floating herb, with bladders . *Utricularia.*
     - 2. Shrubs or herbs. N.O. *Scrophularineæ.* — *Calceolaria.* *Gratiola.* *Glossostigma.* *Limosella.* *Veronica.*
   - B. Monochlamydeous.
     - 1. Trees with 2-celled ovary and opposite leaves . . . . . *Olea.*
     - 2. Shrubs or herbs with tough bark. Ovary 1-celled . . . *Pimelia.*
     - 3. Small tufted herb. (Monocotyledonous.) . . . . *Gaimardia.*
     - 4. Erect herbs. Alternate leaves and green flowers . . . . *Chenopodium.*
   - C. Achlamydeous.
     - 1. Herbaceous. Leaves opposite . *Peperomia.*
     - 2. Shrubby. Leaves alternate . *Piper.*
2. Calyx superior (all herbs).
   - 1. Flowers capitate . . . . . *Acæna.*
   - 2. Flowers panicled . . . . . *Gunnera.*
   - 3. Flower solitary . . . . . . *Donatia.*

See *Lemna* and *Salicornia* in Monandria.

III. Triandria.

- A. Monocotyledonous.
  - 1. Culms fistular, terete . . . . *Gramineæ.*
  - 2. Stems solid, usually 3-angled . *Cyperaceæ.*
  - 3. Anthers 1-celled . . . . . *Restiaceæ.*
- B. Dicotyledonous.
  - 1. Creeping water herb . . . . *Elatine.*
  - 2. Tufted alpine herb . . . . . *Donatia.*
  - 3. Erect broad-leaved herbs . . . *Chenopodium.*

IV. Tetrandria.

1. Calyx inferior.
   - A. Dichlamydeous.
     - a. Leaves opposite.
       - 1. Corolla monopetalous, regular . . . . *Avicennia.*
       - 2. Corolla monopetalous, irregular. Stamens included . *Glossostigma.*
       - 3. Corolla monopetalous, irregular. Stamens exserted . *Mentha.*
       - 4. Corolla polypetalous . . . *Tillæa.*
     - β. Leaves alternate.
       - 1. Stamens opposite petals. . *Suttonia.*
       - 2. Stamens on ovary . . . *Passiflora.*
       - 3. Petals 4, and stamens free . *Lepidium.*
       - 4. Herb with 4-lobed ovary . *Myosotis.*
       - 5. Tree. Petals with scales . *Sapota.*
   - B. Monochlamydeous.
     - a. Leaves opposite (herbs) . . *Colobanthus.*
     - β. Leaves alternate.
       - 1. Spiny shrub . . . . . *Discaria.*
       - 2. Tufted small-leaved herbs . *Drapetes.*
       - 3. Tall serrate-leaved tree . . *Knightia.*
       - 4. Entire-leaved bush . . . *Persoonia.*
       - 5. Herbs with green flowers . *Chenopodium.*
       - 6. Water herbs . . . . . *Potamogeton.*
   - C. Achlamydeous.
     - 1. Salt-water herb, with twisted peduncle . . . . *Ruppia.*
2. Calyx superior, adherent, (limb sometimes obsolete).
   - A. Dichlamydeous.
     - a. Leaves opposite.
       - † Style 1. Stamens opposite corolla lobes.
         - 1. Corolla tubular . . . *Loranthus.*
         - 2. Corolla deeply 4-cleft . *Tupeia.*
       - †† Styles 2. Stamens alternate with corolla lobes.
         - 1. Herbs . . . . . . *Nertera.*
         - 2. Shrubs or trees . . . *Coprosma.*
     - β. Leaves alternate.
       - 1. Large-leaved tree. Petals 4 *Botryodendron.*
       - 2. Bush. Corolla tubular . . *Alseuosmia.*
     - γ. Leaves whorled.
       - 1. Corolla rotate . . . . . *Galium.*
       - 2. Corolla funnel-shaped . . *Asperula.*
     - δ. Leaves 0 . . . . *Viscum.*
   - B. Monochlamydeous.
     - 1. Small tree. . . . . . *Santalum.*
     - 2. Parasitic shrub . . . . . *Tupeia.*

V. PENTANDRIA. *Stamens 5, free (adherent to the stigma in* Parsonsia).

I. Calyx inferior, free.
- A. Dichlamydeous.
  - *a.* Leaves opposite.
    - * Corolla polypetalous.
      - Sepals 5 . . . . . . *Stellaria.*
      - Sepals 2. Seeds 1–2 . *Montia.*
      - Sepals 2. Seeds many . *Claytonia.*
    - ** Corolla monopetalous.
      - Climbing; milky juice . *Parsonsia.*
      - Small under-shrub. . . *Logania.*
      - Erect shrub . . . . . *Geniostoma.*
      - Herb. Stigma 2-lobed . *Gentiana.*
      - Herb. Stigmata 2 . . *Sebæa.*
  - *β.* Leaves alternate.
    - * Corolla polypetalous.
      - § Herbs.
        - † Leaves all radical.
          - Leaves glandular . *Drosera.*
          - Leaves subulate . . *Myosurus.*
        - †† Leaves cauline.
          - Styles free . . . *Linum.*
          - Styles combined . . *Stackhousia.*
      - § Shrubs or trees.
        - Leaves dotted . . . *Suttonia.*
        - Capsule 2-valved . . *Pittosporum.*
        - Anthers with broad connective . . . . *Melicytus.*
        - Petals valvate . . . *Pennantia.*
        - Berry 1-seeded . . . *Corynocarpus.*
        - Capsule 5-celled . . *Ixerba.*
    - ** Corolla monopetalous.
      - Peduncles supra-axillary . *Solanum.*
      - Stamens opposite petals . *Suttonia.*
      - Anthers 1-celled . . . *Epacrideæ.*
      - Stamens alternate. Leaves glandular . . . . . *Myoporum.*
      - Capsule 4-seeded . . . *Convolvulaceæ.*
  - *γ.* Leaves 0 . . . . *Cuscuta.*
- B. Monochlamydeous.
  - *a.* Leaves opposite . . . . . *Colobanthus.*
  - *β.* Leaves alternate.
    - Leaves all radical . . . . *Myosurus.*
    - Spiny shrub . . . . . *Discaria.*
    - Capsule 2-valved . . . . *Pittosporum.*
    - Herbs . . . . *Chenopodieæ.*

II. Calyx adherent, limb superior.
- A. Dichlamydeous. (Leaves alternate.)
  - *a.* Petals many, valvate.
    - Shrub. Capsule many-seeded . . . . *Carpodetus.*
    - Shrub. Fruit 2- or many-celled. Cells 1-seeded . *Araliaceæ.*
    - Shrub. Fruit a 1–2-celled, 1-seeded berry . . . . *Corokia.*
    - Herbs. Fruit 2-celled . . *Umbelliferæ.*
  - *β.* Petals many, imbricate . . . *Quintinia.*
  - *γ.* Petals united (monopetalous).
    - Corolla regular.
      - Stamens opposite lobes . *Samolus.*
      - Stamens alt. with lobes . *Alseuosmia.*
    - Corolla irregular.
      - Style simple . . . . *Goodenia.*
      - Style split . . . . . *Pratia.*
- B. Monochlamydeous . . . . . *Griselinia.*

VI. HEXANDRIA.

I. Dicotyledonous.
- Tree. Leaves very broad, alternate *Botryodendron.*
- Herbs. Leaves opposite . . . *Stellaria.*
- Herbs. Stipules ochreate.
  - Perianth 4–5-parted . . . *Polygonum.*
  - Perianth 6-parted . . . . *Rumex.*

II. Monocotyledonous.
- A. Perianth inferior.
  - *a.* Petaloid.
    - Climbing shrub . . . . *Ripogonum.*
    - Herbs. Flowers solitary.
      - Leaves cauline, remote . *Callixene.*
      - Leaves radical . . . . *Herpolirion.*
    - Flowers racemose, yellow . *Chrysobactron.*
    - Flowers racemose, green, herbaceous . . . . . *Triglochin.*
    - Flowers panicled, glabrous. Capsule elongated . . *Phormium.*
    - Flowers panicled. Capsule rounded . . . . . . *Arthropodium.*
    - Flowers panicled. Berry round . . . . . . *Dianella.*
    - Flowers panicled. Berry lobed . . . . . . *Cordyline.*

Flowers chaffy or silky . . . *Astelia.*
β. Perianth 6-lobed, glumaceous.
Berry indehiscent . . . . *Astelia.*
Capsule 3-valved, 1-celled . . *Luzula.*
Capsule 3-valved, 3-celled . . *Juncus.*
B. Perianth superior.
Flower solitary . . . . . . *Hypoxis.*
Flowers panicled . . . . . *Libertia.*

VII. Heptandria.

Tree, with broad opposite leaves . . *Pisonia.*

VIII. Octandria.

I. Perianth inferior.
A. Carpels distinct; styles as many as carpels.
Carpels one- or few-seeded . *Drimys.*
Carpels many-seeded . . . *Weinmannia.*
B. Carpels solitary or consolidated; style 1.
Herbs with opposite leaves . *Stellaria.*
Herbs with alternate leaves . *Polygonum.*
Shrub with opposite leaves . *Melicope.*
Tree with pinnate leaves . . *Alectryon.*
II. Perianth superior.
Fruit a berry . . . . . . *Fuchsia.*
Fruit a 4-angled capsule . . *Epilobium.*
Fruit indehiscent achænia . . *Myriophyllum.*

IX., X. Enneandria and Decandria.

Perianth inferior in all.
A. Leaves opposite, simple.
Herbs . . . . *Stellaria.*
Shrubs. Carpels and styles distinct . . . . *Coriaria.*
Carpels and styles consolidated.
Corolla polypetalous . . . *Phebalium.*
Corolla monopetalous . . *Gaultheria.*
B. Leaves opposite, pinnate . . . *Ackama.*
C. Leaves alternate.
Leaves pinnate . . . . . *Edwardsia.*
Leaves 3-foliolate . . . . *Oxalis.*
Leaves simple, entire. A polypetalous tree . . . . . *Drimys.*
Leaves simple, serrate. Monopetalous shrubs . . . . *Gaultheria.*
Leaves simple, lobed. Herbs, polypetalous . . . . . *Geraniaceæ.*

XI., XII. Dodecandria and Icosandria.

I. Perianth inferior.
A. Pistils many, distinct.
Leaves compound, 3–5-nate . *Rubus.*
Leaves pinnate. Styles long . *Geum.*
Leaves pinnate. Styles short *Potentilla.*
B. Pistil solitary.
Trees . . . . *Nesodaphne.*
Climber . . . . *Cassytha.*
II. Perianth superior.
Shrubby. Leaves opposite, dotted . . . . *Myrtaceæ.*
Herb. Leaves opposite, fleshy { *Mesembryanthemum.*

XIII. Polyandria.

A. Carpels distinct.
One-seeded. Styles short . . . *Ranunculus.*
One-seeded. Styles feathery . . *Clematis.*
Many-seeded . . . . *Caltha.*
B. Carpels partially adherent . . . *Hypericum.*
C. Carpels consolidated. Style 1.
Leaves opposite.
Drupe with 1-seeded putamen . *Elæocarpus.*
Berry 2–4-celled . . . . . *Aristotelea.*
Leaves alternate. Capsule . . *Entelea.*

XIV. Didynamia.

A. Capsule 2-celled . . . . . . *Scrophularineæ.*
B. Fruit of 4 nuts, or 4-lobed.
Lip superior . . . . *Labiatæ.*
Lip inferior . . . . *Verbenaceæ.*

XV. Tetradynamia.

A. Pod long, narrow, flat.
Valves with evident midrib . . *Arabis.*
Valves without evident midrib . *Cardamine.*
B. Pod long-narrow, tetragonous . . *Barbarea.*
C. Pod short-oblong, turgid . . . *Nasturtium.*
D. Pod short, obcordate, many-seeded *Thlaspi.*
E. Pod short, emarginate, 2-seeded . *Lepidium.*

XVI., XVII., XVIII.

MONADELPHIA, DIADELPHIA, AND POLYADELPHIA.

(*Stamens with their filaments more or less united into bundles.*)

A. Anthers 1-celled. Stamens polyadelphous.
- Fruit a utricle . . . . . . *Alternanthera.*
- Carpels many, many-seeded . . *Hibiscus.*
- Carpels many, 1-seeded . . . *Hoheria.*
- Carpels one or few, 1–3-celled . *Plagianthus.*

B. Anthers 2-celled.
- α. Leaves pinnate.
  - Stamens diadelphous . . . *Leguminosæ.*
  - Stamens monadelphous . . . *Hartighsea.*
- β. Leaves alternate . . . . . *Lobelia.*
- γ. Leaves opposite . . . . . . *Hypericum.*
- δ. Leaves ternate . . . . . . *Oxalis.*

XIX. SYNGENESIA.

A. Flowers aggregated . . . . . *Compositæ.*

B. Flowers solitary.
- I. Polypetalous. Herbs . . . . *Viola.*
- Polypetalous. Shrubs . . . *Melicytus.*
- II. Monopetalous. Leaves opposite *Rhabdothamnus.*
- Leaves alternate.
  - Fruit capsular . . . . . *Lobelia.*
  - Fruit baccate . . . . . . *Colensoa.*

XX. GYNANDRIA.

Stamens 3–4. Filaments free . . . *Passiflora.*
Stamens 2. Filaments connate with style . . . . *Forstera.*
Anthers 2, with no filaments . . . *Orchideæ.*
Anthers 5. Climbing shrubs . . . *Parsonsia.*

XXI. MONŒCIA.

A. Dicotyledonous.
- I. Dichlamydeous.
  - α. Perianth inferior.
    - * Leaves opposite.
      - Pistils many . . . . . *Coriaria.*
      - Pistil one . . . . . . *Olea.*
    - ** Leaves alternate.
      - Stamens opposite petals . . *Suttonia.*
      - Stamens alternate . . . *Sapota.*
  - β. Perianth superior.
    - * Leaves opposite . . . . *Coprosma.*
    - ** Leaves alternate.
      - Flowers umbellate.
        - Trees or shrubs . . . . *Araliaceæ.*
        - Herbs . . . . . . *Umbelliferæ.*
      - Flowers not umbellate.
        - Shrubby . . . . . *Corokia.*
        - Herbaceous . . . . . *Sicyos.*
- II. Monochlamydeous.
  - α. Perianth inferior.
    - * Leaves opposite.
      - Tree. Stamens 6–10 . . *Pisonia.*
      - Shrubs or herbs. Stam. 4–5 *Urtica.*
      - Tree. Stamens 2 . . . *Olea.*
    - ** Leaves alternate.
      - § Trees or shrubs.
        - Leafless . . . . . . *Exocarpus.*
        - Fruit with broad wings . *Dodonæa.*
        - Fruit in a compressed, 3-angled involucre . . *Fagus.*
        - Fruit an ovate drupe . . *Trophis.*
      - §§ Herbs.
        - Stamen 1 . . . . . *Australina.*
        - Flowers involucrate, on a fleshy receptacle . . *Elatostemma.*
        - Flowers in a 2–4-leaved involucre . . . . . *Parietaria.*
        - Stam. and stigmas 2–5 . *Chenopodieæ.*
  - β. Perianth superior.
    - Styles 2 . . . . *Coprosma.*
    - Style 1 . . . . *Tupeia.*
- III. Achlamydeous.
  - Milky herbs . . . . *Euphorbia.*
  - Trees and shrubs . . . . . *Coniferæ.*

B. Monocotyledonous.
- Slender water-herb . . . . . *Zannichellia.*
- Erect marsh-plant, with long catkins . . . . *Typha.*
- Erect marsh-plant, with globose heads of ovaries . . . . . *Sparganium.*
- Scandent shrub, with long leaves *Freycinetia.*
- Erect palm, with pinnate leaves . *Areca.*
- Rush-like, almost leafless herbs . *Calorophus.*

XXII., XXIII. DIŒCIA AND POLYGAMIA.

A. Dicotyledonous.
- I. Calyx inferior.
  - * Leaves opposite.

Climbing shrub . . . . *Clematis.*
Parasitical shrub . . . . *Tupeia.*
Aromatic tree . . . . . *Laurelia.*
Inodorous tree . . . . *Hedycarya.*
Opposite-leaved herb . . *Ascarina.*
** Leaves alternate.
§ Compound, 3–5-nate . . . *Rubus.*
§ § Simple. Anthers with valves *Tetranthera.*
Shrubs or trees.
Stamens opposite valvate petals . . . . . *Pennantia.*
Stamens opposite imbricate petals . . . . *Suttonia.*
Stamens alternate with valvate petals . . . *Pittosporum.*
Petals 0. Stamens 5 or more . . . . . . *Dodonæa.*
Male flower in catkins . *Trophis.*
Herbs.
Flowers on a fleshy receptacle . . . . . . *Elatostemma.*
Flowers in small 2–4-leaved involucres . . *Parietaria.*
II. Calyx superior.
* Leaves opposite . . . . . *Coprosma.*
** Leaves whorled . . . . . *Myriophyllum.*
*** Leaves alternate.
Flowers umbellate. Herbs . *Umbelliferæ.*
Flowers umbellate. Shrubs . *Araliaceæ.*
**** Leaves none . . . . . *Exocarpus.*
B. Monocotyledones.
Perianth 6-parted . . . . . *Astelia.*
Flowers in catkins . . . . . *Leptocarpus.*
Flowers bracteate . . . . . *Calorophus.*

APPENDIX II.

CATALOGUE OF EUROPEAN AND OTHER PLANTS INTRODUCED INTO AND NOW NATURALIZED IN NEW ZEALAND.

The following Catalogue has been suggested by the fact of there existing in many collections, plants which, either from being specified as naturalized, or from other causes, are supposed to be so prevalent, that the unskilled collector would assume their being indigenous to the islands. The numbers of species thus transported (most of them from the antipodes) will be greatly increased with the progress of civilization, and this to a greater extent than in many localities of similar temperature and latitude, because the humid, equable, temperate climate of New Zealand, extending as it does 1100 miles from north to south, offers many facilities for the propagation of species both of warmer and colder climates than its own. This list, however, has no pretensions to completeness, for hitherto the subject to which it refers has not occupied the attention of any colonial botanists, and such alone are competent to work it out.

	NATIVE COUNTRY.
Fumaria *parviflora*, Lam.	Europe (Britain).
Nasturtium *officinale*, Br. (Water-cress.) .	Europe (Britain).
Erysimum *officinale*, L.	Europe (Britain).
Senebiera *didyma*, DC.	Temperate South America. (Introduced into many countries.)
Senebiera *pinnatifida*, DC.	Europe, etc.

	NATIVE COUNTRY.
Alyssum *maritimum*, Willd.	Europe, etc.
Brassica, *several species*	Europe (Britain).
*Gypsophila *tubulosa*, Boiss.	Levant; also West Australia.
Silene *quinque-vulnera*, L.	Europe (Britain, etc.).
Spergula *arvensis*, L.	Europe (Britain, etc.).
Cerastium *vulgatum*, L. and others	Europe (Britain, etc.).
Stellaria *media*, With.	Europe (Britain, etc.).
Polycarpon *tetraphyllum*, L.	Bay of Islands, A. Gray in Bot. U. S. Exp.—This is a very widely diffused European, etc., plant.
Erodium *cicutarum*, Sm.	Bay of Islands, A. Gray in Bot. U.S. Exp.
Ervum *gracile*, DC.	Europe.
Guilandina *Bonduc*, L.	East and West Indies, Pacific Islands, etc.—I have never seen New Zealand specimens, and suspect some mistake. It is introduced into the New Zealand Flora on the authority of Forster.
Medicago *denticulata*, Willd.	Europe (Britain).
Alchemilla *arvensis*, Sm.	A native of Europe (Britain, etc.)—Wild in Australia, according to Brown.
Lythrum *hyssopifolium*, L.	Europe (Britain).
Opuntia *vulgaris*, Mill.	West Indies.—Now introduced into all warm countries.
Fedia *olitoria*, L.	Europe (Britain).
Bidens *pilosa*, L.	North America, and thence introduced into various parts of the world.
Wollastonia *biflora*, DC.?	An Indian plant.
Siegesbeckia *orientalis*, L.	East Indies; thence spread into many countries.
Eclypta *erecta*, L.	Common to many warm countries.
Erigeron *Canadensis*, L.	North America, and thence spread all over the world.
Centaurea *Calcitrapa*, L.	Europe (Britain).
Lapsana *pusilla*, Willd.	Europe (Britain).
Taraxacum *officinale*, DC.	Europe (Britain).
Sonchus *arvensis*, L.	Europe (Britain).
†Stylidium *graminifolium*, Sw.	Australia and Tasmania.
Stylidium *spathulatum*, Br.	Stated by A. Richard to have been collected at Tasman's Bay by D'Urville, but, I do not doubt, erroneously.
†Epacris *purpurascens*, Br.	New South Wales.
Convolvulus *chrysorhizus*, Sol.	Cultivated by the aborigines.
Plectranthus *Australis*, Br.	Bay of Islands, Raoul.—An Australian plant.
Mentha *aquatica*, Spr.	Bay of Islands. Europe (Britain).
Solanum *tuberosum*, L.	South America. (Cultivated in New Zealand.)
Physalis *pubescens*, Br.	South America, abundant; Bay of Islands.
‡Herpestes *cuneifolia*, Spr.	A native of New Zealand, according to M. Raoul, but I suspect some mistake.

* See Supplement.

† Both these plants are introduced upon the authority of very imperfect specimens sent by Dr. Sinclair as having been said to be gathered near Auckland, where both were very rare indeed. See Supplement.

‡ I have so often found the *Gratiola sexdenta*, A. C., to be taken for this plant, that I almost doubt its being really indigenous to New Zealand; it is, however, a very widely diffused plant.

	NATIVE COUNTRY.
Veronica *officinalis*, L.	Europe (Britain).
Anagallis *arvensis*, L.	Europe (Britain).
Plantago *major*, L.	Europe (Britain).
Plantago *lanceolata*, L.	Europe (Britain).
Rumex *crispus*, L.	Europe (Britain).
Rumex *Acetosa*, L.	Europe (Britain).
Jatropha *Curcas*, L.?	South America.
Poranthera *ericifolia*, Rudge	New South Wales. (Auckland, *Sinclair*.)
Euphorbia *Helioscopia*, L.	Europe (Britain).
Urtica *urens*, L.	Europe (Britain).
Dioscorea *alata*, L.	Cultivated by the aborigines.
Caladium *esculentum*, Willd.	Cultivated in New Zealand, and elsewhere in warm climates.
Arum *macrorhizon*, L.	Cultivated by the aborigines.
Avena *sativa*, L.	Europe, etc. (Britain, etc.)
Phalaris *Canariensis*, L.	Europe; naturalized in Britain.
Digitaria *sanguinalis*, Scot.	Europe (Britain).
Poa *annua*, L.	Europe (Britain).
Eleusine *Indica*, Gærtn.	India; introduced throughout warm countries.
Cynodon *Dactylon*, Pers.	India, etc., etc.; introduced throughout warm climates.
Lolium *temulentum*, L.	Europe, etc. (Britain.)
Lolium *perenne*, L.	Europe, etc. (Britain.)
Anthoxanthum *odoratum*	Europe, etc. (Britain.)

SUPPLEMENTUM FLORÆ NOVÆ-ZELANDIÆ.

VOLUME I.

(Page 6.) Clematis *indivisa,* Willd.

This plant has been stated (Steudel in Plant. Preiss.) to be a native of South-west Australia, upon evidence that appears quite insufficient, namely, a comparison of leaves only; the stamens being absolutely essential to the discrimination of species of this genus.

(Page 7.) Clematis *hexasepala,* DC. Var. *rutæfolia.*

Additional specimens of this from Dr. Monro, collected in the neighbourhood of Nelson, rather confirm my opinion of its being only a variety, though a well marked one on the whole; its leaflets are generally narrower than those of *C. hexasepala;* the flowers are identical.

Clematis *fœtida,* Raoul. Var. *β? depauperata.*

Mr. Colenso has sent specimens of this plant in fruit; these have minute tripartite and ternatisect leaves, evidently in a very abnormal state, with leaflets of very various shapes; the carpels are small, very tomentose and villous: it appears clearly an abnormal state of *C. fœtida.*

(Page 8.) After *Ranunculus nivicola,* add—

2 *bis.* Ranunculus *Monroi,* Hook. fil.; scapigerus, sericeo-pilosus, foliis omnibus radicalibus crasse petiolatis rotundato-cordatis grosse crenato-lobulatis coriaceis, scapo s. pedunculo glabro crasso erecto 2–8-floro, floribus subcorymbosis, bracteis lineari-oblongis v. obovatis varie incisis, sepalis lineari-oblongis obtusis glabris, petalis sub-8 aureis obcordatis supra basin fovea nectarifera instructis, antheris late oblongis, carpellis perplurimis immaturis strictis in stylum erectum attenuatis 3-quetris v. sub-3-alatis.

Hab. Middle Island: summit of M'Crae's Run and Fairfield Downs, alt. 4000 feet, *Monro.* Fl. Decemb.

A very distinct and pretty species, intermediate in habit and characters between the Auckland Island *R. pinguis* and *R. nivicola.*—*Whole plant* 5–8 inches high, more or less clothed with white soft silky hairs, especially on the petioles. *Rhizome* very short, covered thickly with black persistent ragged leaf-sheaths, sending down many thick long root-fibres. *Leaves* 3–8, all radical, 1–3 inches long, rounded, with a cordate base, coarsely crenate, hairy on both surfaces, coriaceous and perhaps fleshy when fresh. *Scape* glabrous, twice as long as the leaves, naked below, towards the top bearing 2–8 subcorymbose flowers. *Peduncles* 1–3 inches long, the lower with an oblong or obovate variously cut bract at the base. *Sepals* glabrous or slightly pilose. *Flowers* $\frac{3}{4}$–1 inch across. *Petals* about eight, obcordate, with a deep nectarial pit above the base (as in *R. nivicola*). *Carpels* (young) very numerous, in a globose head, glabrous, straight, with three narrow wings or keels, as in *R. pinguis. Style* straight.

(Page 9.) 3. Ranunculus *geraniifolius,* Hook. fil.

Add to habitats—Middle Island; top of Gordon's Nob, Nelson, *Monro.*

The styles are trigonous, straight, compressed, the angles more or less produced downwards, upon the body of the carpel, which is hence sometimes ribbed.

4. Ranunculus *plebeius*, Br.

Asa Gray (Bot. U. S. Expl. Exped. p. 8) doubts this plant being the same as Brown's New Holland one, and the question, on re-examination, appears to me still open to doubt; though, after a long and careful study, I can find no characters to distinguish it beyond those indicated, and a more slender habit.

5. Ranunculus *hirtus*, Banks et Sol.

Asa Gray (Bot. U. S. Expl. Exped. p. 7) says that he should have supposed this to be the *R. acris* of Richard and Cunningham, but for my quoting that name under *R. plebeius*. There is no mistake in my reference, though there may possibly have been a transposition of tickets in A. Cunningham's Herbarium; but this question can never be settled. Dr. Monro has sent it from Wakefield, in the Middle Island.

6. Ranunculus *multiscapus*, Hook. fil.

Dr. Monro sends a large state of this from Aglionby Plains, with broad trifid or three-lobed leaves, and flowers $\frac{3}{4}$ inch in diameter, in both single and many flowered scapes.

7. Ranunculus *incisus*, Hook. fil.

Numerous additional specimens of this plant do not resolve my doubts as to its specific distinctness from *R. rivularis*, of which it may be a terrestrial state; the styles of the achenia are, however, much longer. I have specimens from marshes in South Australia (Melbourne), gathered by F. Adamson, Esq.

(Page 12.) Drimys *axillaris*, Forster.

Add—*Forst. Char. Gen. t.* 42. Wintera, *Forst. Prodr.*

(Page 13.) After *Cardamine divaricata*, Hook. fil., add—

Gen. I*. ARABIS, *L.*

Pod as in *Cardamine*, but with a more evident midrib on each valve.

Arabis? *fastigiata*, Hook. fil.; glaberrima, caulibus e rhizomate elongato robusto vestigiis foliorum squarroso plurimis strictis erectis fastigiatis, ramis simplicibus ramulosisve, foliis radicalibus anguste lineari- v. lanceolato-spathulatis obtusis acutisve grosse serratis petiolo lato, caulinis linearibus subserratis, floribus subcorymbosis albis, sepalis oblongis obtusis pedicello brevioribus, petalis obovato-spathulatis longe unguiculatis sepalis duplo longioribus, filamentis gracilibus, antheris late oblongis, stylo brevi, stigmate capitato, siliqua gracili lineari acuminata stylo brevi stigmateque obtuso terminata, seminibus elongato-obpyriformibus.

Hab. Middle Island: highest part of M'Crae's Run, on rocks, *Monro.*

A very remarkable plant, resembling in habit the *Cardamine radicata* (Hook. fil. Ic. Plant. t. 882) of the Tasmanian mountains. Owing to the immaturity of the pod, the genus is doubtful; but as the southern forms of *Cardamine* and of *Arabis* (to one of which it belongs) are hardly generically distinct, this point is of less consequence. The discoverer says that only three or four specimens were seen, growing out of a rock, and that they had a strong odour of turnips.—*Rhizome* 2–4 inches long, as thick as the little finger, spongy, covered with the spreading squarrose old persistent petioles. *Branches* very many, ten and more, from the summit of the rhizome, strict, erect, or spreading a little, leafy, all flowering, a span long, slender, some simple, others a little branched. *Radical leaves* 1–3 inches long, $\frac{1}{4}$–$\frac{1}{3}$ inch broad, thick, rather fleshy, narrow, linear-spathulate or lanceolate, sharp or blunt, coarsely serrate, on broad petioles; cauline leaves smaller, less toothed or quite entire. *Flowers* white, in many-flowered corymbs, on slender pedicels. *Sepals* pale green, nerved, oblong, blunt. *Petals* $\frac{1}{4}$ inch long, spathulate, on long claws, white, blunt. *Stamens* with slender filaments and broad anthers. *Pods* suberect, thirty to forty on each

inflorescence, 1½ inch long, ⅛ inch broad, linear, straight (rarely curved), with short apices, short styles, and small blunt stigmas. *Valves* plane, with a distinct medial nerve; replum hyaline, with an obscure medial nerve. *Seeds* narrow pyriform, with elongated apices, attached by long, slender, free cords; testa reticulate.

(Page 15.) After *Lepidium incisum*, Hook. fil., add—

Gen. V. THLASPI, *L.*

Pods as in *Lepidium*, but many-seeded. *Seeds* with accumbent cotyledons.

1. Thlaspi? *australe*, Hook. fil.; humilis, glaberrima v. pilis brevibus albidis conspersis, foliosa, caule simplici v. radice multicipiti, foliis radicalibus elongato-spathulatis lanceolatis ovatisve integerrimis v. crenatis crassis caulinis angustioribus, floribus majusculis dense subcorymboso-capitatis pedicellis crassis, sepalis basi æqualibus oblongis obtusis petalis spathulatis dimidio brevioribus, filamentis filiformibus, antheris lineari-oblongis, ovario obovato v. subobcordato, stylo crasso, stigmate capitato, silicula obcordata, valvis profunde cymbiformibus dorso late alatis, septo angusto, ovulis perplurimis funiculis liberis capillaribus, seminibus (immaturis) rotundatis.

Hab. Middle Island: Gordon's Nob; mountains behind Nelson and Upper Wairau, on talcose gravel, alt. 4000 ped., *Monro*. (Fl. Dec. Jan.)

A small, apparently fleshy herbaceous annual?, 1–4 inches high, of which I have no ripe fruit; it is extremely variable in habit, but cannot be confounded with any other known plant of the Order.—*Root* a very long, slender, simple or branched tap, bearing one or more stems that are simple or branched at the base. *Leaves, stems, pedicels,* and *sepals* perfectly glabrous, or with a few scattered, soft, white, short hairs. *Radical leaves* few, or many and rosulate, ⅓–1 inch long, petiole broad, flat, gradually dilating into a lanceolate, oblong, or broadly ovate, blunt, entire, or crenate lamina; cauline few or many, broad or narrow. *Flowers* white, collected into a many-flowered, dense corymb, which is sometimes effuse from the flower-stalks being ½–¾ inch long. *Sepals* erect, equal at the base. *Petals* white, spathulate, ¼–⅓ inch long. *Pods* broadly obovate or obcordate, flattened, ⅓ inch long with the stout straight style. *Valves* boat-shaped, laterally compressed, with a broad flat nerved wing. *Replum* very narrow, hyaline, nerveless. *Seeds* small, rounded and kidney-shaped, attached by slender free cords.—I much regret that the seeds of this curious little plant are so immature that I cannot determine the position of the radicle, and hence ascertain the genus, which I have considered provisionally to be *Thlaspi*.

(Page 16.) Viola *Cunninghamii*, Hook. fil., ascends to an elevation of 4000 feet on the mountains of the Middle Island, *Monro*.

(Page 22.) Pittosporum *crenulatum*, Putterlich, *Syn. Pittosp. ex Walp. Rep. v.* 1. *p.* 253.

This is a plant mentioned by Putterlich as a native of New Zealand; it appears to agree in general characters with *P. pimeleoides*, but I never saw that plant (or any other species) to have the minutely crenulated leaves attributed to *P. crenulatum* by the above-named author.

5. Pittosporum *eugenioides*, A. Cunn.

Putterlich, l.c., quotes this species as a synonym of *P. umbellatum*, Banks et Sol. (see Asa Gray, Bot. U. S. Expl. Exped. p. 233), doubtless through some accidental error or transposition of tickets; for his description of *P. microcarpum*, Putt., quite agrees with *P. eugenioides*, A. Cunn., and he quotes *P. umbellatum*, A. Cunn. (non B. et S.) as a synonym of it (*microcarpum*). I have a specimen of *P. eugenioides* from R. Cunningham, ticketed "*Pomaderris microcarpa*," which possibly suggested the specific name.

(Page 25.) Before *Stellaria* insert, under Caryophylleæ—

GYPSOPHILA.

1. Gypsophila *tubulosa*, Boiss.; parvula, annua?, hispidulo-pilosa et glandulosa v. glabrata, caulibus

subsimplicibus v. pluries dichotome ramosis suberectis, foliis rigidis subulatis vix acutis, pedicellis axillaribus, floriferis erectis gracilibus foliis longioribus, fructiferis divergentibus, calyce tubuloso basi angustato breviter 5-dentato membranaceo costis 5 herbaceis, petalis linearibus retusis v. bifidis calyce duplo longioribus, capsulæ apice 5-valvi, valvis exsertis, seminibus transverse rugosis grosse impresso-punctatis pallide brunneis.—*Boiss. Diagn. Plant. Orient.*

Hab. Northern Island: East coast, Hawkes' Bay, etc., *Colenso.*

This curious little plant has repeatedly been a subject of study by me. On first receiving a small specimen from Colenso, I was inclined to suppose that it was an escape from some garden, or was introduced in some manner into the island. I have, however, since then, not only received it repeatedly from Colenso, but also find it in Drummond's West Australian collection. Originally the plant was brought from Caria, and from the Meander River and Adramyttian Gulf, near Troy, where no doubt it is indigenous, and whether also in the southern continent must be the subject of future investigation. Meanwhile, there is no doubt of the specific identity of the New Zealand and Levant plants.—The genus *Gypsophila,* which is a large European and Oriental one, may be recognized by its tubular calyx from the other New Zealand *Caryophylleæ.* The present species is a little, stiff, erect, wiry, pubescent or hispid plant, 2–4 inches high, dichotomously branched, with subulate leaves and insignificant flowers on slender pedicels, and with narrow rose-coloured petals.

(Page 26.) For 4. *Stellaria sp.?* insert—

4. Stellaria *gracilenta,* Hook. fil.; gracilis, nodosa, caulibus rigidis teretibus filiformibus puberulis, foliis parvis fasciculatis internodiis brevioribus subulatis glabris dorso (ob margines ad costam recurvas) canaliculatis, pedunculis solitariis terminalibus elongatis 1–2-floris medio bibracteolatis, sepalis oblongis acutis 3-nerviis, petalis bipartitis, capsulæ valvis sepalis longioribus.

Hab. Middle Island: Nelson, *Bidwill.* Manuka Island, *Monro.*

A remarkably distinct species, of which I had very indifferent specimens, noticed in the body of this work as being in fruit only, and which I consequently thought it unadvisable to name. Since then Dr. Monro has sent small specimens in flower, but not a full enough series of them to enable me to describe its characters as broadly as is desirable. It is allied to the Tasmanian *T. angustifolia,* but has much more rigid wiry stems, smaller leaves, and all the nodes are proliferous, having very short leafy branches, which give the stem the appearance of bearing tufts of leaves along its whole length.—*Stems* very slender, 2–6 inches long, terete, pubescent. *Leaves* in pairs, about ½ inch asunder, each pair with an abbreviated branch in their axil, perfectly glabrous, subulate, rigid, curved, the margins revolute to the midrib. *Flowers* on long, slender, erect, terminal peduncles, that bear two minute bracts about the middle, about ⅓ inch in diameter. *Sepals* linear-oblong, acute, three-nerved, with broad scarious margins. *Petals* two, cleft to the base, half longer than the sepals. *Stamens* ten, inserted in a five-lobed fleshy disc. *Ovary* broadly ovoid. *Styles* three. *Capsule* six-cleft; valves short, blunt, protruded beyond the sepals.

(Page 31.) Hoheria *Lyallii,* Hook. fil.

Asa Gray, in the 'Botany of the U.S. Exploring Expedition,' p. 180, points out an important error in plate xi., figs. 4–6, where the radicle is wrongly represented as superior and dorsal in reference to the carpel. Dr. Gray further considers that this plant should be removed from *Hoheria* and referred to *Plagianthus,* along with two Tasmanian species of *Sida* (*S. pulchella* and *S. Tasmanica*), these plants only differing from one another generically in the number of carpels, which are reduced to one in *Pl. sidoides.* Dr. Gray further remarks that the stigmas of *H. populnea* are terminal, those of *H. Lyallii* introrse and terminal. The latter plant will henceforth, if this opinion be confirmed, bear the name of *Plagianthus Lyallii,* Asa Gray (Bot. U.S. Expl. Exped. l. c.).

(Page 35.) Pennantia *Endlicheri,* Reiss, which has been mentioned as a New Zealand plant, is not so, but a native of Norfolk Island.

(Page 36.) Hypericum *gramineum,* Forst.

Add to the synonyms—*Brathys Forsterii*, Spach, in Ann. Sc. Nat. ser. ii. v. 5. p. 367.

(Page 38.) Hartighsea.

I quote entire the following just criticism of my friend Asa Gray (Botany of the U.S. Expl. Exped. p. 239), together with his foot-note on the origin of the name. "Dr. Hooker has overlooked Mr. Bennett's remark (in Pl. " Jav. Rar. p. 170), that this is not a true species of *Hartighsea*, but differs from the true species . . . in the " entire want of cohesion between the petals and the staminal tube, and consequently of the petals *inter se* (not- " withstanding the description given by Forster), and in several other characters of minor importance. He has, " moreover, conformed the generic character to the exception; the phrase, '*petala basi cum tubo stamineo obscure* " *coalita*,' being inapplicable to the typical *H. Fraseriana*, in which the cohesion extends to the middle of the sta- " minal tube. I have not seen that species, nor does its fruit appear to be known; but, except in its shorter tubu- " lar disc, it seems to differ in no essential particular from the older genus *Didymochiton*, to which I should con- " fidently refer *H. Forsteri*, Juss., along with a species in the present collection (Herb. U.S. Expl. Exp.). If " this view were adopted, the name of *Hartighsea* might be retained for *H. spectabilis* and *H. Billardieri*.—The " genus was not named after G. L. Hartig (who was, moreover, a German, not a 'French' author), but in honour " of a Dutch navigator, whose name, though not given by Jussieu, must have been *Hartighs* or *Hartighse*."— *A. Gray*, *l. c.*

(Page 46.) 3. Pomaderris.

I have received another specimen of this plant from Mr. Joliffe, who collected it at Mercury Bay, but it is also without flower or fruit. This, however, settles the question as to its being indigenous to New Zealand.

(Page 50.) Carmichælia, *Br.*

I have received many forms of *Carmichæliæ* from Mr. Colenso, Dr. Monro, and others, and they certainly do not tend to clear up the difficulty of discriminating the species, but rather complicate them, several of these being intermediate between those already defined. The whole genus requires careful revision in New Zealand, and a judicious selection of ticketed specimens from the same and different individuals at many different localities, various periods of growth, different seasons of the year, etc. Their habits and variations should also be watched narrowly in a growing state.

(Page 52.) Edwardsia *grandiflora*, Salisb.

I have omitted to state under this plant that the flowers vary in size as conspicuously as the foliage does.

E. myriophylla, Wenderoth in Linnæa, v. 5. p. 201; Walp. Rep. v. 1. p. 806, is a trifling variety of *E. grandiflora*, or rather a very common state of that plant.

(Page 54.) Acæna *Sanguisorbæ*, Vahl.

Add to the synonyms—*A. diandrum*, Forst. Prodr. A. Rich. Flor. Raoul, En. Plant. Nov. Zeald.

Acæna *inermis*, Hook. fil.

Hab. Middle Island: Upper Wairau and Lake Rotuita, Nelson, *Monro*.

I have also received from Dr. Monro specimens, in a very young state, of what may prove to be the *Acæna ascendens*, Vahl, of Auckland Island, Fuegia, etc. They were collected on the mountains south of Nelson by a shepherd, at Dr. Monro's request.—I find only two stamens in the buds, and an elongated stigma. The whole plant is much more glabrous and more robust than *A. Sanguisorbæ*.

(Page 55.) Geum.

I have had two opportunities of reconsidering this genus since describing the New Zealand species; one when examining the Himalayan forms, and now again, when determining some additional specimens from New Zealand. The result is far from satisfactory. With regard to the common Tasmanian and New Zealand plant referred to *G. Magellanicum*, I have no further observations to make, except that I am happy to find that Asa Gray (Bot. U.S.

Expl. Exp. p. 501) approves of the union of the species quoted under it as synonyms, and adds, that consistently with this view, the name *G. strictum*, Ait., should be preferred; in which I agree.

As regards *G. parviflorum*, Comm., I am still in difficulty. Dr. Monro has sent me specimens in flower of what is clearly my *Sieversia* (*Geum?*) *albiflora* of Auckland Island, though it has orbicular petals and villous carpels with uncinate apices. This appears in most respects absolutely identical, except in the rather larger flower, with a plant from the Patagonian Andes (collected by W. Lobb), which is in flower, and has also the young fruit of a *Geum*, but which appears to have yellow flowers. Mr. Colenso's specimens from the Northern Island are more villous and more densely leafy, but otherwise identical with Dr. Monro's, and are apparently white-flowered; but neither are these in fruit. Lastly, I have a much larger plant in ripe fruit from Dr. Lyall (collected in Milford Sound, and alluded to under *G. Magellanicum*), which may be a large state of this; and if so, it presents good characters in the achænia, which are strict, narrow, linear-lanceolate, villous, with long soft hairs, and are gradually narrowed into a slender, strict, subulate style, with a short hook at its apex. Should Dr. Lyall's, my Auckland Island plant, Dr. Monro's, and Mr. Colenso's, prove one and the same, and different from the South American species, the name *Geum albiflorum* is most applicable.

(Page 58.) After Epilobium *macropus* insert—

3 *bis*. Epilobium *brevipes*, Hook. fil.; glaberrimum, crassiusculum, caule procumbente lignoso tereti, ramis breviusculis ascendentibus confertim foliosis teretibus cortice rubro v. atro, foliis ($\frac{1}{2}$–$\frac{3}{4}$ unc.) omnibus oppositis patentibus oblongo-lanceolatis v. lineari-oblongis subobtusis obscure denticulatis marginatis crassis aveniis utrinque concoloribus v. subtus petiolisque elongatis subroseis, pedunculis brevibus axillaribus capsulisque foliis subduplo longioribus gracilibus glaberrimis, sepalis petalis paullo brevioribus linearibus acutis, petalis pallidis bifidis, stylo gracili clavato.

Hab. Middle Island: Kaikora Mountains, south of Nelson; alt. about 2–4000 feet, *Macdonald*.

An exceedingly handsome plant of its size, allied to *E. macropus*, but very much more robust, with nearly entire crowded leaves, longer petioles, very short peduncles, and smaller flowers. Everywhere perfectly glabrous and polished.—*Stems* straggling, woody, as thick as a crow-quill; bark black. *Branches* 4 inches long, also black, or fine red-purple, ascending, rather crowded. *Leaves* crowded, all opposite, spreading, linear or oblong-lanceolate, rather blunt, or narrowed into a slender red petiole, nerveless, upper surface green, under the same colour, or reddish. *Flowers* few, in the upper axils; peduncles short. *Ovaries* and ripe capsules slender, curved, $1\frac{1}{2}$ inch long. *Flowers* pale. *Sepals* red, narrow. *Petals* about $\frac{1}{4}$–$\frac{1}{3}$ inch long, bifid for one-fourth the way down. *Stigma* clavate.—I have four good specimens of this: had I forty, I should probably have to modify the above characters. The student must allow for considerable variations.

3 *ter*. Epilobium *crassum*, Hook. fil.; glaberrimum, crassum, coriaceum, depressum, caule robusto repente brevissimo dense folioso, foliis (1 unc. longis) confertis subcarnosis suberectis oppositis ovato- v. spathulato-oblongis obtusis marginatis subintegerrimis aveniis costa obscura in petiolum brevem crassum angustatis, floribus paucis, ovariis (immaturis) crassiusculis breve v. longius pedunculatis, floribus majusculis, petalis purpureis, sepalis lineari-ovatis $\frac{1}{2}$ longioribus.

Hab. Middle Island: top of M'Crae's Run, 4000 feet, Nelson, *Monro*. (Fl. Dec.)

A very singular species, allied to the preceding. I have only four good specimens, and consequently allowance must be made for deviations from the descriptions. No species is comparable with this for the short, stout, fleshy habit, its dense foliage, which is large for its size, and also rather large flowers.—Everywhere quite glabrous. *Stems* 2–4 inches long, nearly as thick as a goose-quill, creeping, sending down thick fleshy fibres. *Leaves* opposite, densely crowded, about an inch long, fleshy, nerveless, almost quite entire, or remotely obscurely denticulate, spathulate, blunt, with a thick margin, green, more or less suffused with red-purple, especially below. *Peduncles* axillary, few, stout, short or long, old ones apparently elongated. *Ovaries* about twice as long as the upper leaves, ro-

bust, quite glabrous. *Flowers* fully $\frac{1}{3}$ inch long; sepals narrow, ovate or ovate-lanceolate, subacute, one-third shorter than the rosy petals, which are bifid one-third down. *Stigma* clavate.

Epilobium *confertum*, A. Cunn., Prodr., and

Epilobium *haloragifolium*, A. C., l. c.,

Are both omitted in this work. I believe the former to be *E. junceum*, and the latter *E. alsinoides*, but I found it impossible in all cases to identify the tips of branches, upon which Cunningham had sometimes founded his species of this most difficult and protean genus. I have examined large suites of New Zealand specimens since the publication of this Flora, and find the arrangement and limitation of the species I have proposed to hold good.

(Page 63.) Haloragis *tenella*, Brong.

Asa Gray (Bot. U.S. Expl. Exped. p. 626) refers this to *H. micrantha*, Gray (*Goniocarpus micranthus*, Thunb.), a native of Japan; he also notices that it is the *Haloragis tenella* of Brongniart (not *Goniocarpus*, as I have misquoted it), and further, that it is not the *G. tenellus*, DC. Dr. Monro has sent specimens from Nelson.

(Page 71.) After *Myrtus bullata*, insert—

2. Myrtus *Ralphii*, Hook. fil.; arbuscula, ramis ramulis petiolis pedunculisque puberulis, foliis late ellipticis obtusis acutisve planis glaberrimis v. secus costam puberulis, pedunculis axillaribus solitariis 1-floris folio brevioribus, floribus tetrameris, bacca globosa.

Hab. Northern Island: woods at Wellington, *Ralph*. Forests near the East Coast, *Colenso*.

Very nearly allied to *M. bullata*, but with narrower, less coriaceous, flat leaves, and smaller flowers; the peduncles are one-flowered, but frequently have two small scars beneath the flower.

(Page 72.) Sicyos *angulatus*, L.

Gray (Bot. U.S. Expl. Exped.) remarks, that the male flower and fruit of *S. australis* are only half the size of those of *S. angulatus*; but in all my New Zealand specimens the male flowers and fruit are quite as large as in any American ones of *S. angulatus*, and larger than in many. I therefore still believe these species (*angulatus* and *australis*) to be the same.

(Page 74.) Mniarum *fasciculatum*, Br., *Prodr. Raoul*, *p.* 43.

Hab. New Zealand, *Raoul*.

This, which is a Tasmanian plant, appears to have been found at Akaroa, in the Middle Island, by M. Raoul; it is very closely allied to *M. biflorus* (*Scleranthus*, mihi), and should, with it, be referred to *Scleranthus*. It is distinguished by the pubescent branchlets, leaves toothed along the whole margin, and short fruiting peduncles.

(Page 77.) Tetragonia, *L.*

There are probably two species of this genus in New Zealand, but I cannot satisfactorily define them from dried specimens; one seems to be considerably larger than the other. Possibly the smaller one is the *Tetragonella implexicoma*, Miquel, of the Australian coasts, a genus that does not appear to differ sufficiently from *Tetragonia*; and the larger, the true *T. expansa*, Sol., De Candolle, (Plantes Grasses, t. 114; Endl. Prodr. Fl. Ins. Norf.; *T. oleracea*, Forst. Prodr.)

(Page 79.) Ackama *rosæfolia*.

Gray (Bot. U.S. Expl. Exped. p. 671) gives a detailed accurate description of this plant, pointing out that I have described imperfect seeds, and referring the genus to a section of *Weinmannia*. The same able botanist appears to doubt my correctness in describing the calyx as valvate, which, however, it most decidedly is.

(Page 88.) Aciphylla *squarrosa*, Forst.

Dr. Monro sends the varieties *α* and *β* as states of one species, remarking that that which I described as var. *β*, *latifolia*, is the "Spear Grass" and "Wild Spaniard" of settlers, and that at Fairfield Downs it is extremely

abundant, forming a barrier impenetrable to sheep and horses. It does not grow below 2000 feet elevation. The var. α. *angustifolia* is smaller, and grows at lower levels. Dr. Monro alludes to another form as growing at a still lower level, 1000 feet above the sea, and having a flowering stem 6–8 feet high. This latter is no doubt Forster's original plant, and is certainly that described by myself as the same with the above. My own impression is, that if there are two species, they will correspond to the varieties α and β, viz. with broad and narrow leaflets.

(Page 88.) After *Aciphylla squarrosa*, insert—

3. Aciphylla *Monroi*, Hook. fil.; foliis radicalibus basi vestigiis vetustis vaginarum dense obtectis lanceolatis oblongo-lanceolatisve bipinnatis coriaceis, pinnis 6–8-jugis, pinnulis paucijugis lineari-lanceolatis acuminatis pungentibus striatis, petiolo supra basin ad vaginam et ad basin pinnarum articulato, articulo ad basin petioli utrinque foliolo subulato aucto, caule superne subdivaricatim ramoso, ramis basi bractea patente interdum pinnata lineari pungente suffultis, umbellis compositis, involucellis radiantibus radiis exterioribus longioribus, floribus parvis, ♀ calycis dentibus 5 inæqualibus, petalis obovato-oblongis acutis incurvis costa crassa carinatis, staminibus incurvis, stylopodiis pulvinatis, stylis 0.

Hab. Middle Island: summit of M'Crae's Run, alt. 4500 ped., Nelson, *Monro*. Fl. Dec.

A very remarkable species, apparently quite distinct from *A. squarrosa*, but these *Umbelliferæ* are extremely deceptive. A very similar plant, if not the same species, has been sent from Mount Buller, Victoria (Australia), by Dr. Ferd. Müller, as *Anisotome glacialis*, F. M., but this is in fruit only, and appears to differ from the New Zealand plant in the much larger size, short petioles, and different involucres on the inflorescence. Dr. Monro's specimens are in flower only.—*Stem* very stout at the base, densely covered with dry withered remains of old foliage. *Leaves* 3–7 inches long, oblong, bipinnate; pinnules 1–1½ inch long, flat, very coriaceous, linear or linear-lanceolate, acuminate, pungent, with cartilaginous margins. *Flowering stem* 6 inches high. *Umbels* on alternate short branches of the stem, each subtended by a linear involucral leaf 1–2 inches long, which is the semiamplexicaul sheath of a leaf that sometimes bears a few pinnules. *Flowers* small, in small dense-flowered compound umbels, the latter subtended by radiating subulate partial involucres.

(Page 88.) Anisotome, *Hook. fil.*

Dr. Monro sends a solitary specimen of a small species of this genus, not in flower, from the mountains around Nelson, which appears very different from any described. The specimen, probably a seedling plant, is only five inches high. Two leaves are present, with broadly reniform, rotundate, or orbicular laminæ, ternately decompound into subulate segments. It is apparently allied to the Auckland Island *A. antipoda*, Hook. fil., and belongs to the section with compound radical leaves.

(Page 90.) Eustylis.

The name *Eustylis* has, I am informed by Dr. Asa Gray, been preoccupied by a genus of *Irideæ;* and that of *Anisotome* is almost rendered invalid by that of *Anisotoma*, Fenzl. (in Linnæa, 1843, vol. xvii. p. 330), a genus of *Asclepiadeæ*. As, however, all will probably merge into *Aciphylla*, Forster, the present nomenclature may stand provisionally.

(Page 93.) Panax *simplex*, Forst.

The leaves, which I have described as coarsely serrate, are sometimes only lobed along the margin, or almost entire. Asa Gray mentions the young leaves as occasionally opposite.

This plant, together with *P. arboreum*, Gray suggests may be referable to *Hedera*, to which genus he refers *Aralia crassifolia*, *A. Lessoni*, and perhaps others of the New Zealand *Araliaceæ*. The Natural Order is, I am happy to find, about to undergo a complete revision by MM. Decaisne and Planchon.

(Page 95.) Aralia *polaris*.

Asa Gray establishes the genus *Stilbocarpa* (which I have suggested, p. 95) for this plant, founding it on the imbricate petals and the acetabuliform fruit. I have stated that the petals "seem hardly valvate," which Asa Gray

supposes to imply a doubt on my part. The expression is a bad one; but I intended by it to say, that the petals were neither exactly imbricate nor valvate, but intermediate in character; the fact is that they appear much more strongly imbricate in dried specimens than in living ones.

(Page 100.) Loranthus *flavidus*, Hook. fil.

Add to habitat—Middle Island; Nelson, Ray's Valley, on *Fagus Solandri*, Monro.

(Page 105.) Coprosma *fœtidissima*, Forst.

Raoul refers Forster's *C. pusilla* to A. Richard's *C. repens*, which latter I have doubtfully referred to *C. fœtidissima.*

(Page 110.) Coprosma *microcarpa*, Hook. fil.

This plant, which I have stated to be only a few inches high, attains, according to Mr. Colenso, eight to ten feet.

(Page 112.) Nertera *dichondræfolia*, Hook. fil.

This is the *N. gracilis* of Raoul (in Ann. Sc. Nat. 1844. p. 121), a plant which, as pointed out by himself in the 'Choix de Plantes,' is identical with *Geophila dichondræfolia*, A. C., but which synonym I omitted to quote in the body of this work.

(Page 114.) Asperula *perpusilla*: add—
Hab. Middle Island: Upper Motucka, *Monro.*

(Page 115.) Olearia.

Olearia *insignis*, Hook. fil.; ramulis petiolis foliis subtus pedunculis involucrisque dense albo-tomentosis, foliis crassis oblongis supra nitidis integerrimis, petiolis basi vaginantibus, pedunculo terminali solitario elongato crasso, capitulo magno, involucri pluriseriati foliolis exterioribus majoribus oblongis obtusis interioribus perplurimis linearibus aristato-acuminatis, pappi setis exterioribus brevibus inæqualibus, interioribus æquilongis apice incrassatis, achenio sericeo.

Hab. Middle Island: banks of Waihopai River, Nelson, on dry, rocky ground, *Monro.* (Fl. Jan.)

A very fine species, and quite different from any hitherto described. I have only the termination of a branch, with two leaves and a capitulum, and so cannot frame a character that will include varieties.—*Young branches* very stout, and, as well as the petioles, under surface of leaves, peduncle, and involucre, covered with a dense compact tomentum. *Leaves* very coriaceous, 5 inches long, 2½ broad, oblong, rounded at both ends, quite entire, glossy above and pubescent along the midrib. *Petiole* robust, plane or channelled above, 1 inch long, dilated at the base. *Peduncle* terminal, as long as the leaf (but probably variable), very stout, solitary, one-flowered. *Capitulum* broadly campanulate, 1½ inch broad; *scales* very numerous, lower oblong, blunt; upper small, acuminate, with hair-like, somewhat recurved points. *Florets* white, those of the circumference in one row, with narrow ligulæ. Inner hairs of pappus few, long, club-shaped at the tip. *Achenium* silky, very long and narrow.

(Page 121.) Celmisia *coriacea*, Hook. fil.

I omitted to introduce under the synonyms—Aster coriaceus, *Forst. Prodr. A. Rich. Flor. A. Cunn. Prodr. etc.* I originally referred both this plant and *Aster holosericeus* to *Celmisia* in the 'Flora Antarctica,' vol. i. p. 36. Dr. Monro sends specimens from the Rotuiti Lake and elsewhere, and remarks that it is called "Leather-plant" by the colonists.

(Page 123.) Celmisia *incana*, Hook. fil.: add—
Hab. Gordon's Nob, and top of M'Crae's Run, growing in dense tufts at 5000 feet elevation, *Monro.*

(Page 123.) Add at the end of § b. of Celmisia—
7. Celmisia *laricifolia*, Hook. fil.; parvula, caule ascendente subelongato folioso, foliis perplurimis

dense confertis erectis v. patenti-recurvis anguste lineari-subulatis setoso-acuminatis supra glaberrimis subtus incano-tomentosis marginibus recurvis, scapo araneoso, bracteis paucis subulatis, capitulo parvo, involucri conici squamis subulatis erectis dorso araneo-pilosis marginibus membranaceis glabris, floribus disci stigmatibus valde hispidis, acheniis setosis.

HAB. Middle Island: Gordon's Nob, Nelson, *Monro.*

A very remarkable little species, much the smallest of the genus hitherto discovered, and well characterized by the stems being covered densely with narrow, almost subulate, erect or spreading, sharp-pointed leaves, about $\frac{2}{3}$ inch long, and $\frac{1}{2}$ line broad; they are glabrous above, densely covered with white tomentum beneath. *Scape* slender, 3–4 inches long, loosely covered with floccose wool. *Bracts* few, scattered, very narrow. *Capitulum* $\frac{1}{3}$ inch long; involucre conical; florets purple?—I have only seen two specimens.

(Page 134.) To *Ozothamnus* add—

4. Ozothamnus *coralloides,* Hook. fil.; densissime cæspitosa, ramis brevibus crassis ob folia brevia densissime et arctissime imbricata quasi tuberculatis inter folia lanatis, foliis concavis late oblongis obtusis basi membranaceis apice crasse coriaceis nitidis dorso convexis basi marginibus et pagina superiore molliter lanatis, capitulis inter folia summa obtectis solitariis terminalibus.

HAB. Middle Island: Kaikora mountains, *M'Donald* (*Monro*).

This, which is one of the most remarkable plants in New Zealand, was, together with the following, collected by Roderick M'Donald, a shepherd, for Dr. Monro, upon the Kaikora Mountains, south of Nelson. It appears from its habit to form dense, probably hemispherical, masses on the ground, and bears inconspicuous, terminal, solitary, sessile capitula, which are hidden amongst the leaves. There can, I think, be little doubt of its belonging to *Ozothamnus,* being closely allied to the following plant and to *O. microphyllus.*—*Branches* cylindrical, as thick as the little finger, densely tubercled with the closely imbricating, shining, knob-like apices of the leaves. *Leaves* oblong, blunt, $\frac{1}{4}$ inch long; lower part membranous, upper very coriaceous and shining; upper surface densely clothed with long, soft, white wool.

5. Ozothamnus *Selago,* Hook. fil.; depressus, caule crasso confertim ramoso, ramis ramulisque cæspitosis inter folia lanatis foliis brevibus appressis arctissime multifariam imbricatis tectis, foliis late ovatis obtusis concavis basi membranaceis apice coriaceis pagina superiore dense molliter lanatis dorso subcarinatis infra apicem sæpissime plaga ovata notatis, capitulis solitariis terminalibus inter folia nidulantibus, involucri squamis paucis, interioribus capitulo longioribus anguste linearibus incurvis acutis scariosis parce pilosis, floribus fœmineis ambitu paucissimis.

HAB. With *O. coralloides, Monro.*

This species closely resembles the *O. microphyllus,* but differs in the shorter, stouter branches, carinate, larger leaves, much smaller capitula, sunk amongst the upper leaves, and the fewer, narrower, longer, inucrved involucral scales.

(Page 135.) Raoulia *glabra,* Hook. fil.

In the specific description, for "involucri squamis *interioribus,*" read "*exterioribus.*"

(Page 136.) Raoulia *subsericea,* Hook. fil.: add—

HAB. Wellington, *Col. Bolton.* Middle Island: Upper Wairau Valley, and Aglionby Plains, *Monro.*

Raoulia *grandiflora,* Hook. fil.: add—

HAB. Middle Island: summit of Gordon's Nob, Nelson, *Monro.*

6. Raoulia *bryoides,* Hook. fil.; densissime cæspitosa, incano-tomentosa, ramulis cylindraceis obtusis, foliis minimis erecto-patentibus arcte multifariam imbricatis lineari-cuneatis infra apicem glaberrimis sub-

membranaceis apice subtriangulari superne dense sericeo-hispidulis dorso marginibusque longissime lanatis, involucri squamis 2–3 seriebus radiantibus albis lineari-lanceolatis acutis, acheniis hispidis.

HAB. Middle Island: summit of Gordon's Nob, Nelson, *Monro.*

A very remarkable little species, excessively densely congested into hard round masses, but probably, like *R. australis*, variable in this respect, in which case it will come very near *R. subsericea*, differing in the much smaller and differently shaped leaves, as also in the very much smaller capitula. The whole plant resembles a Moss, and is an exceedingly distinct species.

(Page 137.) Gnaphalium *prostratum*, Hook. fil.: add—

HAB. Middle Island: Upper Wairau valley, Nelson, *Monro.*

(Page 139.) Under *G. involucratum*, Forst., add the synonym *Euchiton Forsteri*, Cass.

(Page 144.) Senecio *bellidioides:* add—

HAB. Middle Island: Upper Wairau valley, *Monro.*

(Page 146.) Senecio *Lyallii*, Hook. fil.: add—

HAB. Middle Island: summit of M'Crae's Run, alt. 5000 feet, *Monro.*

Dr. Monro's specimens have broader leaves and ligulæ than Dr. Lyall's, approaching in this respect the *S. scorzoneroides*, which may prove a variety of this plant.

(Page 150.) 19. Senecio *Monroi*, Hook. fil.; fruticosa, ramulis cylindricis pedunculis petiolis foliisque subtus incano-tomentosis, foliis gracilibus petiolatis obovato-oblongis obtusis coriaceis margine crispatis supra nitidis obscure reticulatim venosis, capitulis versus apices ramulorum subpaniculatis, pedunculis pedicellisque foliis parvis bracteatis, involucri late campanulati squamis linearibus tomentosis acutis apicibus subrecurvis non sphacelatis, ligulis lineari-lanceolatis, acheniis linearibus pilis brevibus albidis hispidulis.

HAB. Middle Island: mountains of Kaikora, alt. 2–4000 feet, *M'Donald* (*Monro*).

This plant was collected by a shepherd for Dr. Monro, and is one of several novelties he has sent from those regions, and which presage many more. As a species it is closely allied to *S. Greyi.*—A bush, or perhaps small tree. *Branches*, petioles, leaves below, peduncles, and involucres covered with appressed white down or wool. *Leaves* 1–1½ inch long, on slender petioles ½ inch long, coriaceous, obovate-oblong, blunt, with crisped margins. *Capitula* ¾ inch across, terminating the numerous small branchlets which form peduncles and pedicels to them, and make a branched, subcorymbose inflorescence, which is leafy with small bract-like leaves. *Involucral scales* linear, tomentose, with acute, rather recurved lips. *Ligulæ* linear, golden-yellow. *Pappus* of fine silky hairs, minutely scabrid. *Achenium* obscurely ribbed, papillose or hispid with short white hairs.

(Page 154.) Nat. Ord. STYLIDIEÆ.

The *Stylidium graminifolium*, Swartz (Br. Prodr. p. 568; DC. Prodr. vol. vii. p. 333; Bot. Mag. t. 1918), an extremely abundant East and South Australian and Tasmanian plant, has been gathered near Auckland by Dr. Sinclair and Colonel Bolton. Only one tuft, however, was found, and I cannot but suspect its having been introduced into the island.

(Page 155.) Forstera *clavigera*, Hook. fil.: add—

HAB. Middle Island: Gordon's Nob, Nelson, *Munro.*

(Page 161.) Gaultheria *antipoda*, Forst.

I have received several more specimens of the different forms of this variable plant: these tend to confirm my opinion of all the varieties enumerated being referable to one species.

(Page 165.) Leucopogon *Colensoi*, Hook. fil.: add—

HAB. Middle Island: Gordon's Nob, Nelson, *Monro.*

(Page 166.) Epacris *purpurascens*, Br., *Prodr. p.* 550. *DC. Prodr. v.* 7. *p.* 760. *Bot. Mag. t.* 844.

This very handsome and ornamental shrub has been found in one spot only, at Papa-kuru, about eighteen miles from Auckland, where it was seen both by Colonel Bolton and Dr. Sinclair. It is so difficult to conceive a common New South Wales plant to be truly indigenous, and yet so anomalously scarce, that I hesitate to introduce it into the Flora as a native; if it really be so, it is the only exception to the fact of all the native shrubs occurring in abundance wherever they are found, and being widely distributed.

(Page 170.) Dracophyllum *filifolium*, Hook. fil.: add—
HAB. Middle Island: Upper Wairau Valley, Nelson, *Monro*.

This fine genus wants a complete revision, and probably a reduction of the species. This cannot be effected properly except in the islands, and should be undertaken with great care. I am quite ignorant of the amount of variation in the different species.

(Page 172.) Suttonia.

In the generic character read "Stamina 4–5," and in the English description "*Corolla* of four or five," etc.

(Page 173.) Suttonia *divaricata*, Hook. fil.; var. *β. montana*.

Better specimens of this plant, received from Mr. Colenso, assure me that this is a distinct species, which will bear the name of *S. montana*, Hook. fil.

(Page 178.) Gentiana *montana*, Forst., et *G. saxosa*, Forst.

More numerous specimens of these plants increase the difficulty of distinguishing them, and give a still greater idea of the excessive variability of each. Pages might be filled with descriptions of their forms, but to little profit, as it appears to me.

(Page 179.) Parsonsia.

The remarks upon the *Gentianæ* apply equally to this genus. I am far from convinced that there is more than one species. Such genera cannot be well investigated without selected suites of specimens from the same individual, and from different individuals in the same localities; also a fair selection from all the localities the species inhabits should be examined.

(Page 182.)

In the notes at the end of the genus *Solanum* the words "and the Tomato" should be inserted before "(*Lycopersicon*)."

(Page 188.) Mimulus? *radicans*, Hook. fil.: add—
HAB. Middle Island: Wakefield, *Monro*.

(Page 189.)

After *Gratiola* the genus *Herpestes* should possibly be inserted, as I find the *H. cuneifolia*, Spr., introduced into M. Raoul's 'Choix de Plantes.' Some states of *Gratiola sexdentata* resemble a *Herpestes* very strongly.

(Page 191.) Veronica.

I have received many excellent specimens of various forms of this genus, from Colenso and Monro especially, since the publication of the above, and I must confess that they do not tend to resolve the doubts I have as to the validity or invalidity of many of the species of each section. I find no strong reason, however, for modifying materially the arrangement I have proposed.

(Page 197.) Veronica *Anagallis*, L.

It should have been mentioned, under this plant, that it is frequent in all northern temperate latitudes, and throughout Great Britain.

(Page 199.) Euphrasia *antarctica.*

Add, after the specific character—Bentham in DC. Prodr. vol. x. p. 355.

Euphrasia *revoluta,* Hook. fil.

Dr. Monro has sent fine specimens from the summit of Gordon's Nob, Nelson; these have larger flowers than those of the specimens described.

(Page 200.) Myosotis *capitata,* Hook. fil.

Dr. Monro has sent small specimens of this species from the mountains south of Nelson.

Myosotis *antarctica,* Hook. fil.: add to the stations—

HAB. Upper Waihopai River, *Monro.*

I am inclined to suspect that this may prove to be a state of *M. spathulata;* both are extremely variable plants.

(Page 201.) Myosotis (Exarrhena) *Lyallii*: add—

HAB. Dun Mountain, Nelson, *Monro.*

(Page 205.) Nat. Ord. LABIATÆ.

Plectranthus australis, Br. Prodr., is mentioned by M. Raoul as a native of the Bay of Islands, where it is no doubt introduced.

(Page 205.) Scutellaria *Novæ-Zelandiæ,* Hook. fil.; glaberrima v. parce pilosa, caulibus obscure angulatis gracilibus ascendentibus laxe foliosis subramosis, foliis omnibus (inferioribus longe) petiolatis orbiculari-oblongis reniformibus ovato-oblongisve integerrimis v. remote paucidentatis, floribus oppositis subracemosis violaceis?, calyce piloso, squama labio superiore breviore, corolla pubescente calyce duplo longiore, fauce parum dilatata, galea mediocri, labio inferiore breviore.—S. humilis, *hujus operis p.* 205; *non Br. Prodr.*

HAB. Middle Island: Foxhill, Nelson, *Bidwill, Monro.*

I described this plant, in the body of this work, from very imperfect specimens. I have received much better since, from which I judge it to be distinct from the Australian *S. humilis,* differing chiefly in the longer petioles of the leaves, which are rounder, less hairy, and the stem is much less angled.

(Page 210.) Polygonum *australe,* A. Rich.

The name *adpressum,* Lab., should have been retained for this species. It is figured under that name in the 'Botanical Magazine,' t. 3145.

(Page 211.) Polygonum *axillare,* Hook. fil.: add—

HAB. Foxhill and banks of Waihopai river, Nelson, *Monro.*

(Page 214.) Suæda *maritima,* Dum.

Under this plant, the *Chenopodina tortuosa,* Moq. Tand. (in DC. Prodr. 13. pl. ii. p. 162), *Suæda tortuosa,* Moq. Tand. (Chenop. p. 131) should probably be included as a synonym.

(Page 218.) Nat. Ord. MONIMIACEÆ.

This Order should be transferred to the neighbourhood of *Magnoliaceæ,* to which it is closely allied, whereas it has no real affinity with *Laurineæ.* In the generic character of *Laurelia,* read "*Stamina* 6–14," and in the English description read "*Perianth* 5–6-parted," and "*Stamens* 6–14."

(Page 219.) Persoonia *Toro,* A. Cunn.

This plant is figured in the 'Botanical Magazine,' t. 3513.

(Page 220.) Pimelea, *Banks et Sol.*

This genus has been dismembered by Ernest Meyer, who founds genera on the corolla being articulate or non-articulate, the perianth of the fruit fleshy or dry, aud the quantity of albumen in the seed.

(Page 223.) Drapetes *muscosa*, Hook. fil.

This specific name was inadvertently misapplied, it being that of the Antarctic American species. I have already (Introd. Essay, p. 34, in note) proposed that of *D. Lyallii* for this plant.

(Page 236.) Potamogeton *ocreatus*, Raoul.

I have received specimens of this plant from Sinclair and Colenso, which, though not very complete, enable me to refer it, without much doubt, to *P. compressus*, L. (ex Fries, Novit.), having compared it with an authentically named specimen from Fries.

3. Potamogeton *pectinatus*, L.; gracilis, foliis anguste linearibus subacutis 1-nerviis venulis transversis subremotis, stipulis vaginæ adnatis scariosis longe pedunculatis, spicis fructiferis interruptis, nuculis compressis oblique obovatis.—*Linn. Sp. Pl. Brit. Fl.*

Hab. Northern Island; brackish water, common on the east coast, *Colenso*.

Stems slender, varying in length with the depth of water, matted, floating. *Leaves* 2–4 inches long, scarcely a line broad, with one central nerve, and transverse veinlets leaving square areolæ.

(Page 239.) Earina *mucronata*, Lindl.: add *Hook. Ic. Plant. t.* 431, excluding synonyms.

(Page 243.) Thelymitra, *Forst.*

Dr. Sinclair finds the same difficulty in distinguishing the forms or species of this pretty genus, as I do.

(Page 247.) Caladenia *Lyallii*, Hook. fil.: add—

Hab. Gordon's Nob, Nelson, *Monro*.

Caladenia *bifolia*, Hook. fil.

Hab. Northern Island: Ruahine Mountains, *Colenso*.

Specimen in fruit, but apparently the same as the Otago plant.

(Page 255.) Chrysobactron *Rossii*, Hook. fil., *Fl. Antarct. p.* 72. *t.* 44, 45.

I have seen two specimens of this plant (a native of Auckland and Campbell Islands), communicated by Colonel Bolton, R.E., who assures me that they were gathered at Otago, in the Middle Island, by Sir G. Grey.

(Page 256.) Phormium *tenax*, Forst.

I have received a great many more specimens of forms intermediate between vars. α and β, since the publication of this plant in the body of this work.

(Page 288.) Nat. Ord. Gramineæ.

Since the Grasses were elaborated for the New Zealand Flora, I have received a general monograph of the Order, by Steudel, of Eslingen, entitled 'Synopsis Glumacearum.' I find about thirty New Zealand species there enumerated, including the imperfectly described ones of Richard, etc., and amongst them are some new genera of Steudel's, which, from the descriptions, I am quite unable to recognize. It appears to me, from what I can gather, that some of the species are not referred to the genera or tribes in which I (in common with all other botanists who have studied the Order) have placed them; others, and several of the genera, are founded upon very imperfect specimens, and in no case does the author give the particular habitat or collector's name.

(Page 291.) After *Paspalum*, insert—

Panicum *tenax*, Trin., *Diss.* 11. *p.* 122, *et Steudel, Synops. Glum. p.* 27.

I am not acquainted with this Grass.

(Page 300.) Hierochloe *redolens,* Br.: add synonyms—*H. racemosa,* Trin. Phalarid. p. 33. *H. Antarctica,* Steudel, Syn. Glum. p. 14.

(Page 304.) Danthonia *nuda,* Hook. fil.; glaberrima, cæspitosa, culmis gracilibus rigidis, vaginis sulcatis, foliis rigide setaceis filiformibus involutis basi utrinque ad apicem vaginæ ciliato-barbatis, ligula brevissima longe ciliata, panicula parva pauci(8–10)-flora, glumis glabris concavis acuminatis apice scaberulis 1-nerviis 3-floris, floribus inclusis, palea inferiore basi sericeo-ciliata utrinque versus margines supra basin fasciculo parvo pilorum aucta, aristis lateralibus brevibus intermedia brevi subexserta.

Hab. Northern Island: mountains near the east coast, *Colenso.*

A small, rigid, wiry, tufted, glabrous species, with slender culms a span long, leafy nearly to the panicle, and small, rather lax, few-flowered panicles.—*Sheaths* slender, furrowed, glabrous, with a tuft of long hairs on each side at the summit, and a short ciliated ligula, or simply a row of hairs. *Leaves* involute, rigid, spreading. *Glumes* equal, one-nerved, glabrous except towards the acuminate tips, which are scabrid. *Florets* about three, included, less hairy than in the other species, each with a ring of hairs at the base. *Lower palea* with seven nerves, and a small tuft of a few long hairs on either side, between the outermost nerve and the margin. *Lateral awns* very short, middle one twice as long, shortly exserted beyond the glumes. *Ovary* broad, pedicelled, with diverging styles, very remote at the base, and very scanty plumose stigmata.—This appears to be a most distinct species.

(Page 307.) At the end of *Poa,* insert—

Quid "P. implexa, Trin. Act. Petrop. 1831. p. 388. *P. australis,* Sieb. Hb. *P. Sieberiana,* Sprengel. *P. Sprengelii,* Kunth. *P. imbecilla,* Spr. *fid.* Trin.?"

The following Genera and Species of Gramineæ *are taken from Steudel's Synopsis, where all are said to be natives of New Zealand:—*

Paniceæ.

1. Kampmannia *Zeelandiæ,* Steud. l.c., p. 35.
2. Hystericina *alopecuroides,* Steud. l. c., p. 35.
3. Panicum *gonatodes,* Steud., p. 95 = Isachne *australis,* Br.?
4. Hekaterosachne *elatior,* Steud., p. 119.

Stipaceæ.

5. Dichelachne *rigida,* Steud., p. 120 } = Agrostis, *Richard: see p.* 297.
6. Dichelachne *procera,* Steud., p. 121 } = Agrostis, *Richard: see p.* 297.

Agrostideæ.

7. Agrostis *vaginata,* Steud., p. 174. (*Aira* in Hb. Raoul.)
8. Agrostis *elatior,* Steud. (*A. pilosa?* Hb. Mus. Paris. Raoul legit.)

Arundinaceæ.

9. Arundo *Kakao,* Steud., p. 194 = *A. conspicua,* Forst.?
10. Arundo *triodioides,* Trin., Steud. l. c. = Schedonorus *littoralis,* Pal.
11. Gynerium? *Zeelandicum,* Steud., p. 198 = Arundo *conspicua,* Forst.?

Avenaceæ.

12. Danthonia *Raoulii,* Steud., p. 246 = *D. rigida,* Raoul.
13. Danthonia *cingula,* Steud., p. 246 = *D. Antarctica,* Hook. fil.?
14. Triodia *splendida,* Steud., p. 249.

FESTUCACEÆ.

15. Poa *hypopsila*, Steud., p. 263 = *P. imbecilla*, Forst.?
16. Eragrostis *eximia*, Steud., p. 279.

HORDEACEÆ.

17. Triticum *Solandri*, Steud., p. 347 = *T. scabrum*, Br.

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(Page 3.) In the foot-note, line 5, for *Analepis* read *Arthropteris*.

(Page 6.) Gleichenia *flabellata*, Br.

Exclude the synonym Lab. Sert. Aust. Caled.

(Page 39.) The Plate LXXX. of *Nephrodium velutinum* is accidentally lettered *N. molle*.

(Page 48.) Todea *Africana*, Willd.

Colonel Bolton has informed me that this plant was found at the north extreme of the Island, where it occurred abundantly, and not, as was supposed, at Auckland. This fact is quite in accordance with what we know of the distribution of New Zealand plants, there being several warm-country forms confined to the north extreme, as *Cassytha* and *Drosera pygmæa*.

Nat. Ord. FUNGI.

Cordyceps *Sinclairii*, Berkeley; lutescens, stipite simplici l. furcato sursum in ramos plurimos subsimplices lobatosve cylindricos diviso.

HAB. Northern Island; on the larvæ of some Orthopterous insect, amongst loose gravelly soil, in the garden of Archdeacon Williams, Tauranga, Poverty Bay.

Yellowish, from $\frac{3}{4}$–1 inch high. *Stems* cylindrical, slender, simple or forked, sometimes confluent, $\frac{1}{3}$ inch or more high, divided above into numerous, more or less cylindrical, either simple or slightly-lobed heads, which are sometimes disposed into a flabelliform mass, clothed with innumerable oblong conidia $\frac{1}{3500}$ of an inch long.

The specimens are unfortunately destitute of perithecia. The pale yellowish tint, inclining to lemon-colour, seems characteristic, and forbids, in the first instance, their union with *Cordyceps sobolifera*, a West Indian species, which also occurs on Orthopterous larvæ. In that species, however, the normal form seems to be simply clavate as in *Cordyceps entomorrhiza*, and the divisions are merely proliferous. There does not seem, in the present case, to be any indication of such a primitive form, and, in consequence, I suppose the head to be essentially divided, as in *Cordyceps Taylori*. I have therefore no hesitation in considering it as new, more especially as the West Indian species is a purely tropical form, and does not ascend as far as the Southern United States, which produce some New Zealand species, but is represented by an allied form still normally simple on the larvæ of cockchafers.

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[The Synonyms are in italics.]

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THE END.

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Plate LXXI.

et. lith.

F. Reeve, imp.

Gleichenia Cunninghamii, *Hewd.*

F. Reeve, imp.

Cyathea Smithii, *Hook, fil.*

Fitch, del. et lith.

F. Reeve, imp.

Alsophila Colensoi, *Hook, fil.*

Plate LXXIV.

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F. Reeve, imp.

F. Reeve, imp.

Lomaria procera, *Spr,* var. minor.

Fitch, del et lith

F. Reeve, imp.

Lomaria Banksii, [illegible]

tch del. et

Asplenium lucidum, *Forst.*; *var. Lyallii.*

Fitch, del. et. lith.

L. Reeve imp.

Polystichum aristatum, *Presl.*

Plate, LXXIX.

Fitch, del. et. lith.

F. Reeve, imp.

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Plate, LXXX.

-ton, del et lith.

F. Reeve, imp.

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Plate, LXXVI.

Fitch, del. et lith.

F. Reeve, imp.

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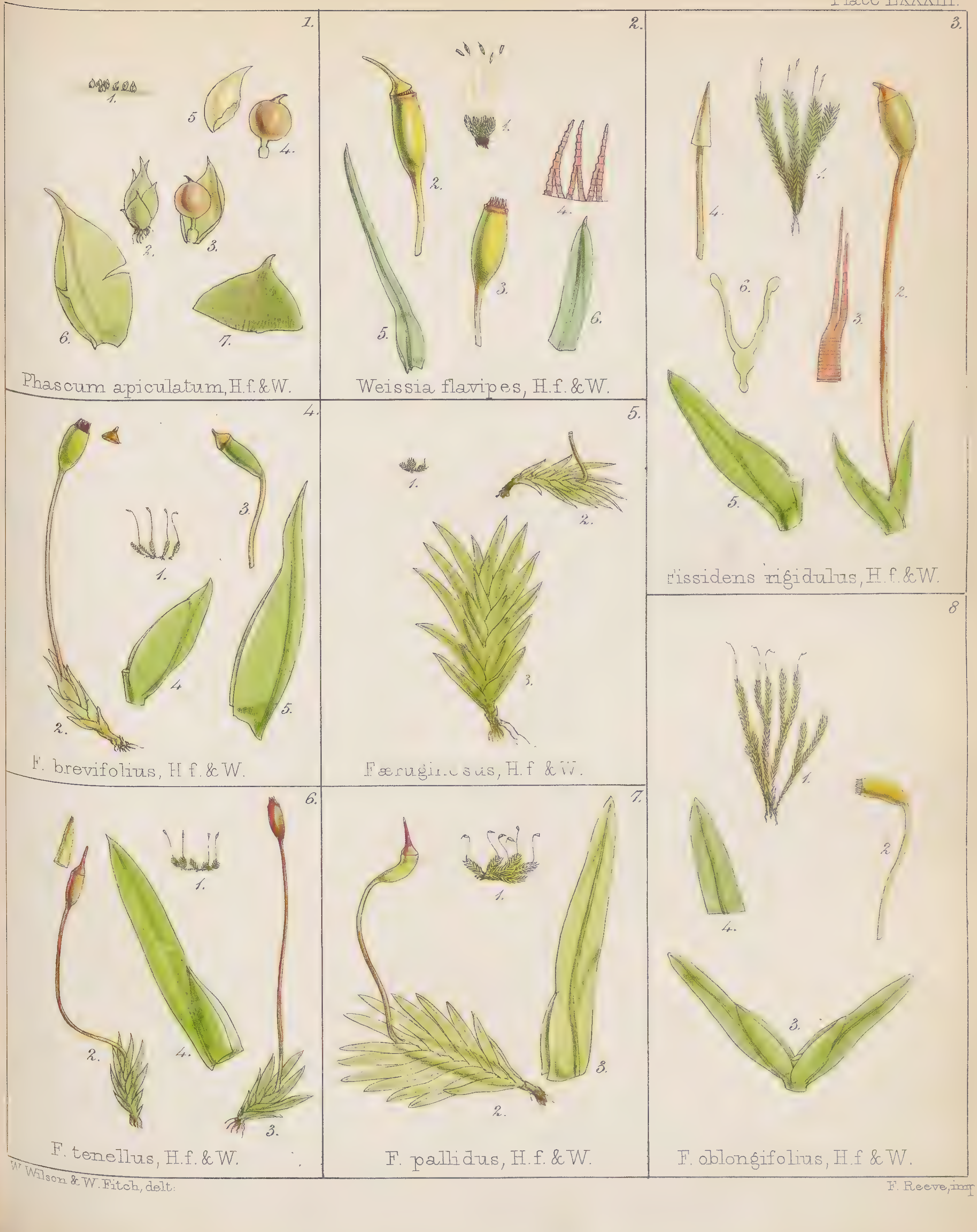
Plate, LXXXII.

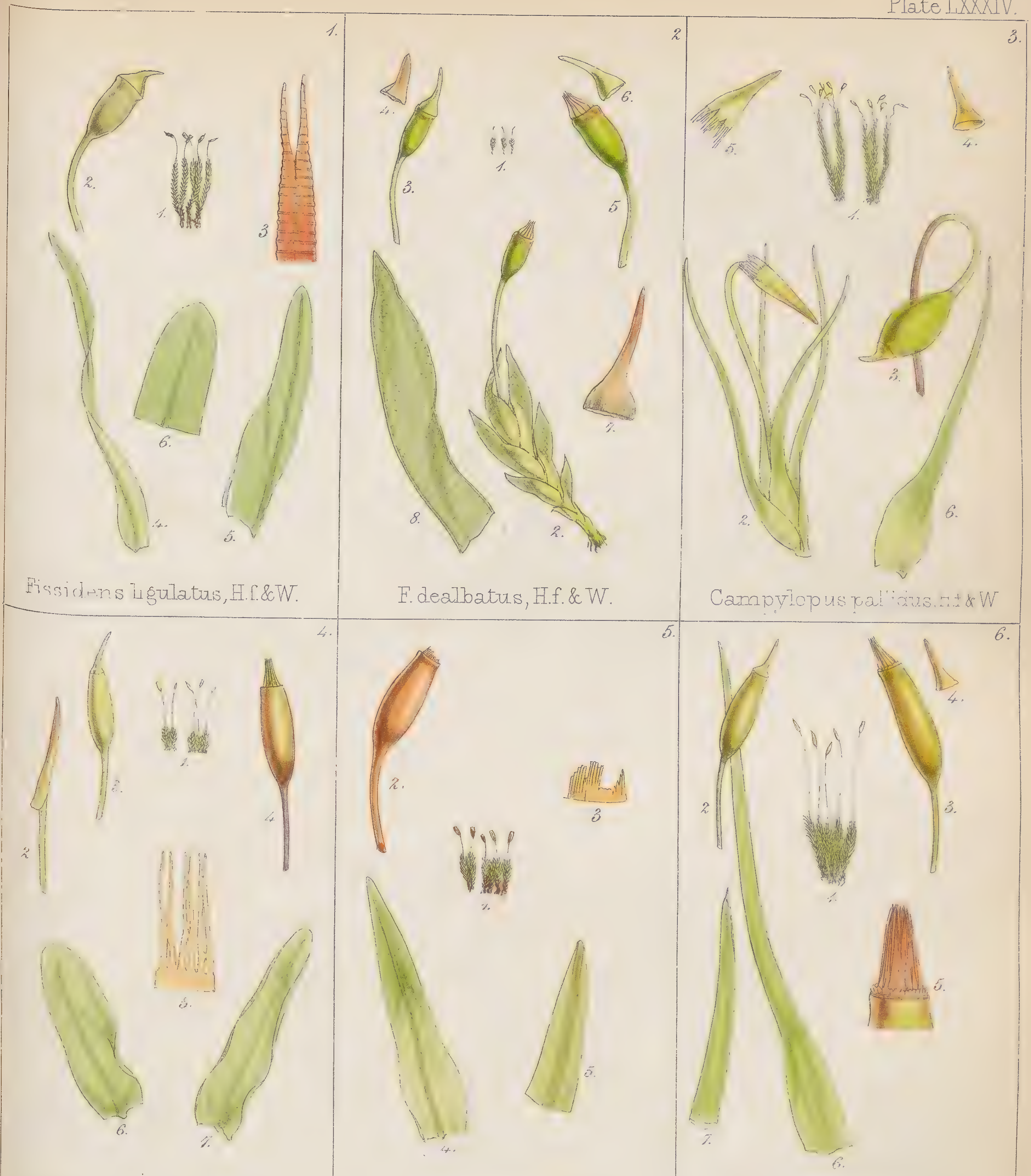
Fitch, del. et lith.

F Reeve imp.

Arthropteris tenella, J. Sm.

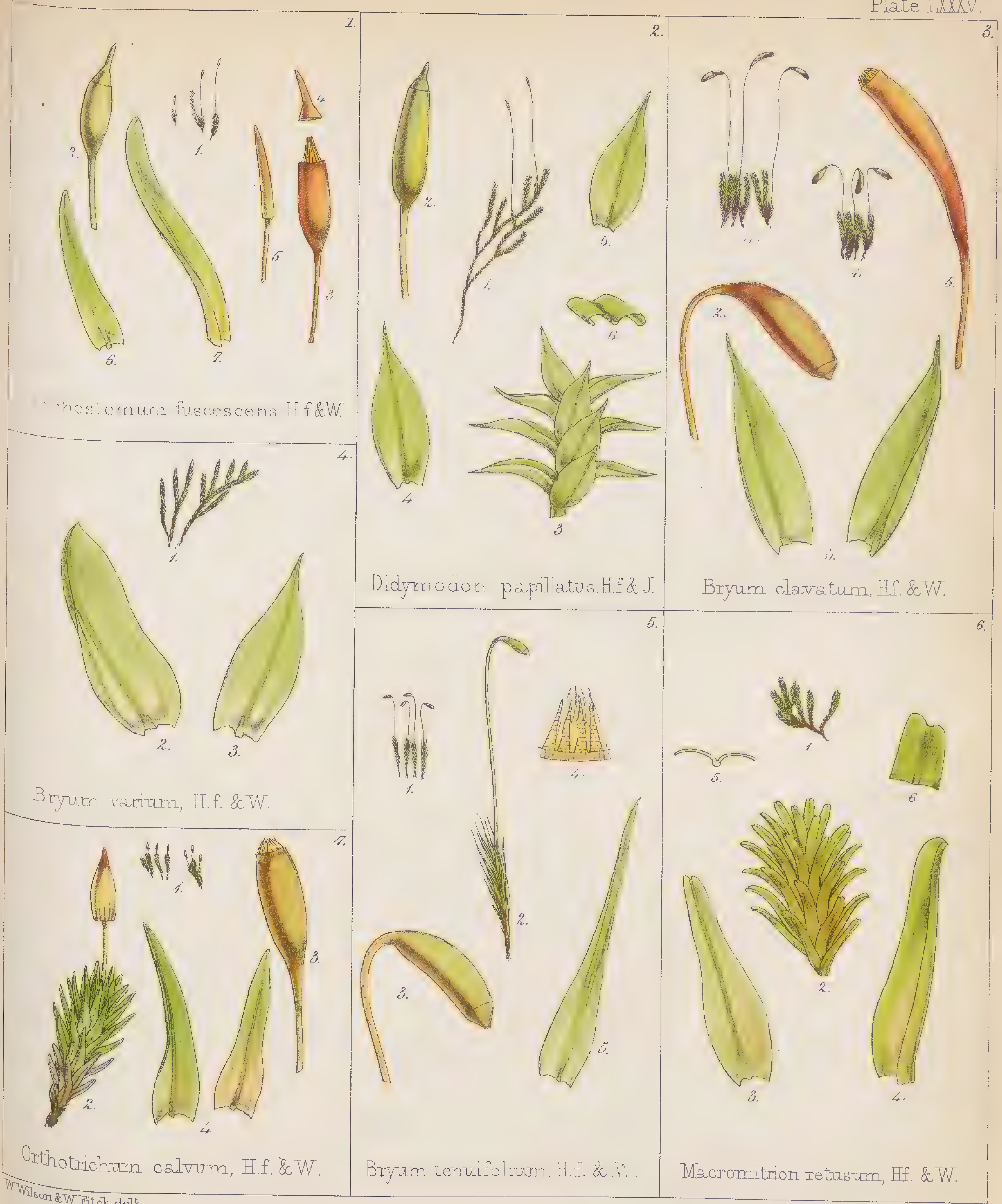


W. Wilson & W. Fitch, delt. F. Reeve, imp.



1. Fissidens ligulatus, H.f.&W.
2. F. dealbatus, H.f. & W.
3. Campylopus pallidus, H.f.&W.
4. Trichost. lingulatum, H.f.&W.
5. T. phæum, H.f. & W.
6. T. setosum, H.f. &W.

Plate LXXXV.



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2. Didymodon papillatus, H.f & J.

3. Bryum clavatum, Hf. & W.

4. Bryum varium, H.f. & W.

5. Bryum tenuifolium, H.f. & W.

6. Macromitrion retusum, Hf. & W.

7. Orthotrichum calvum, H.f. & W.

W Wilson & W Fitch, del^t

F. Reeve, imp.

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Conostomum pusillum, H.f. & W.
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W. Wilson & W. Fitch, del.

F. Reeve, imp

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Neckeva lævigata, H.f & W

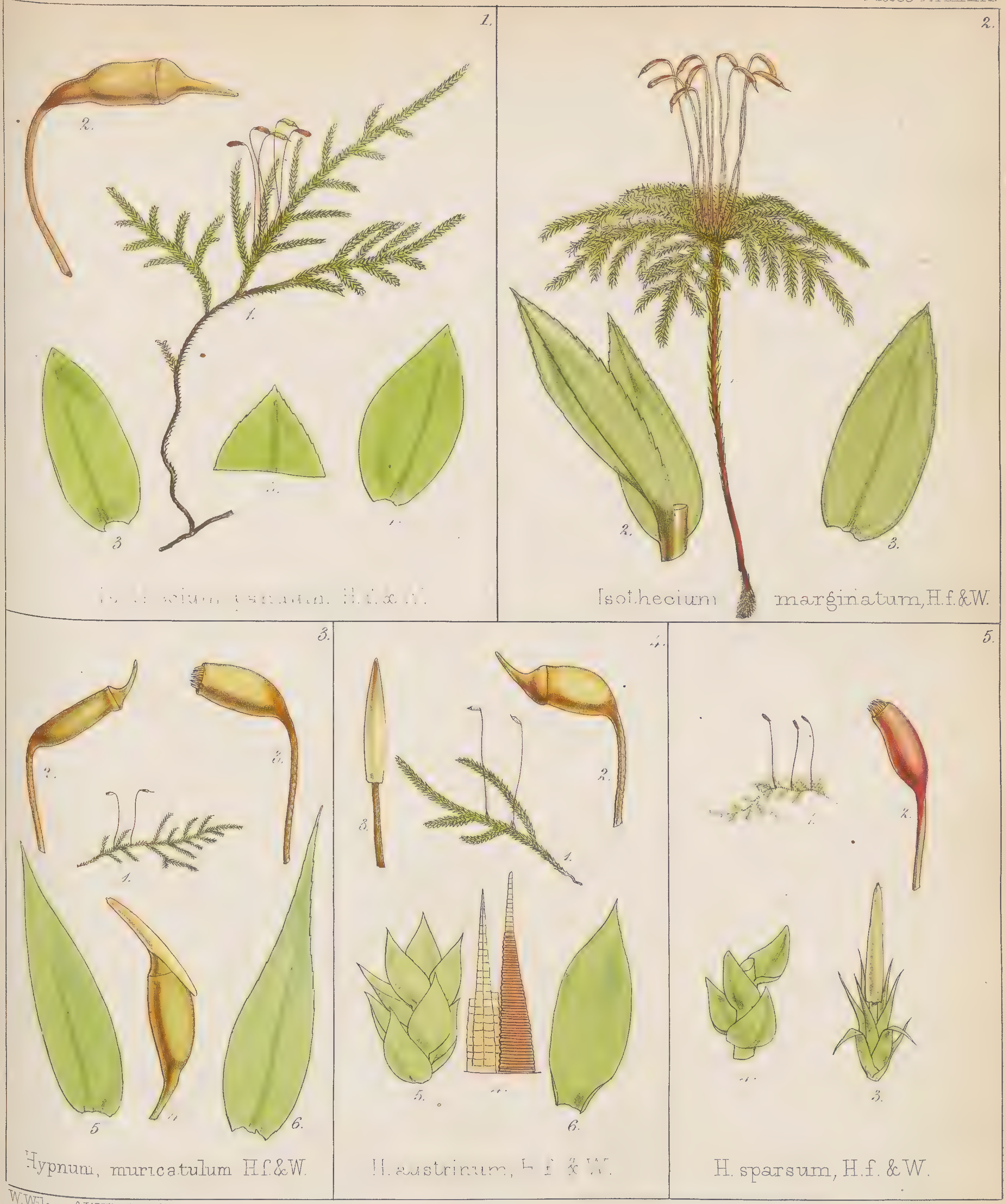
Cryphæa acuminata H.f & W

Isothecium pulvinatum, H.f & W.

Phyllogonium elegans, H.f & W

Hypnum furfurosum, H.f & W.

Plate LXXXIX.



W. Wilson, & W. Fitch delt.

F. Reeve, imp.

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H. clandestinum, H.f. & W.

H. divulsum, H. f. & W.

H. inflatum, H.f. & W.

H. patale, H.f. & W.

W. Wilson & W. Fitch, del[t].

F. Reeve, imp.

W. Wilson & W. Fitch, del[t]

F. Reeve, imp.

W. Wilson & W. Fitch del.

Vincent Brooks Imp

Plate XCIII.

Hookeria rotundifolia, H.f. & W.

H. crispula, H.f. & W.

H. amblyophylla, H.f. & W.

H. adnata, H.f. & W.

H. robusta, H.f. & W.

H. nigella, H.f. & W.

W. Wilson, & W. Fitch del[t]

F. Reeve, imp.

Plate XCIV

W Mitten del W Fitch lith.

Vincent Brooks Imp.

W Mitten del. W Fitch lith. Vincent Brooks Imp.

Plagiochila Stephensoniana, Mitten

Plagiochila radiculosa, Mitten

P incurvicolla Hf & T

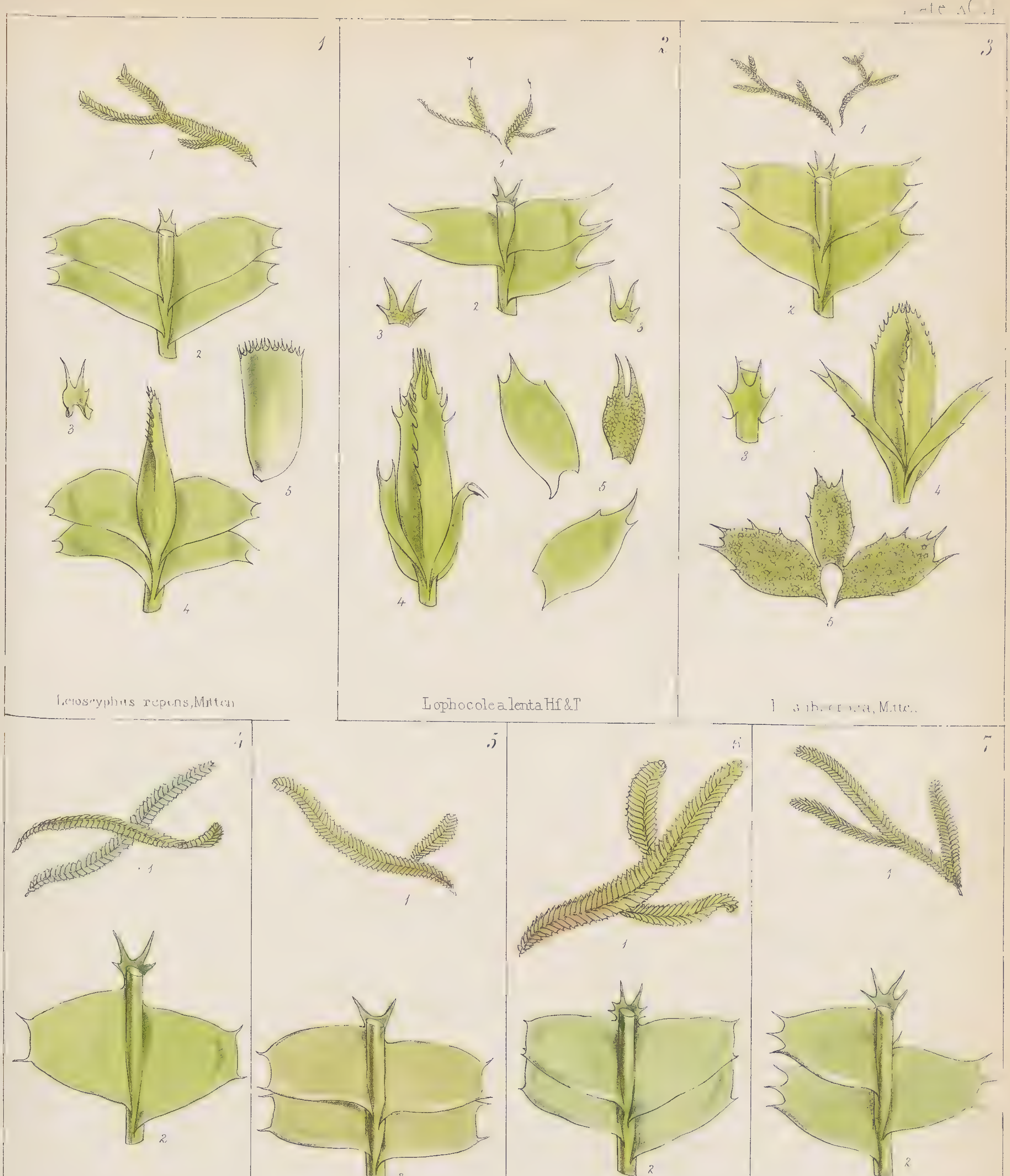
P. Dicksoni , Hf & T

P Lyallii , Mitten

P Sinclairii , Mitten

W Mitten del W Fitch lith

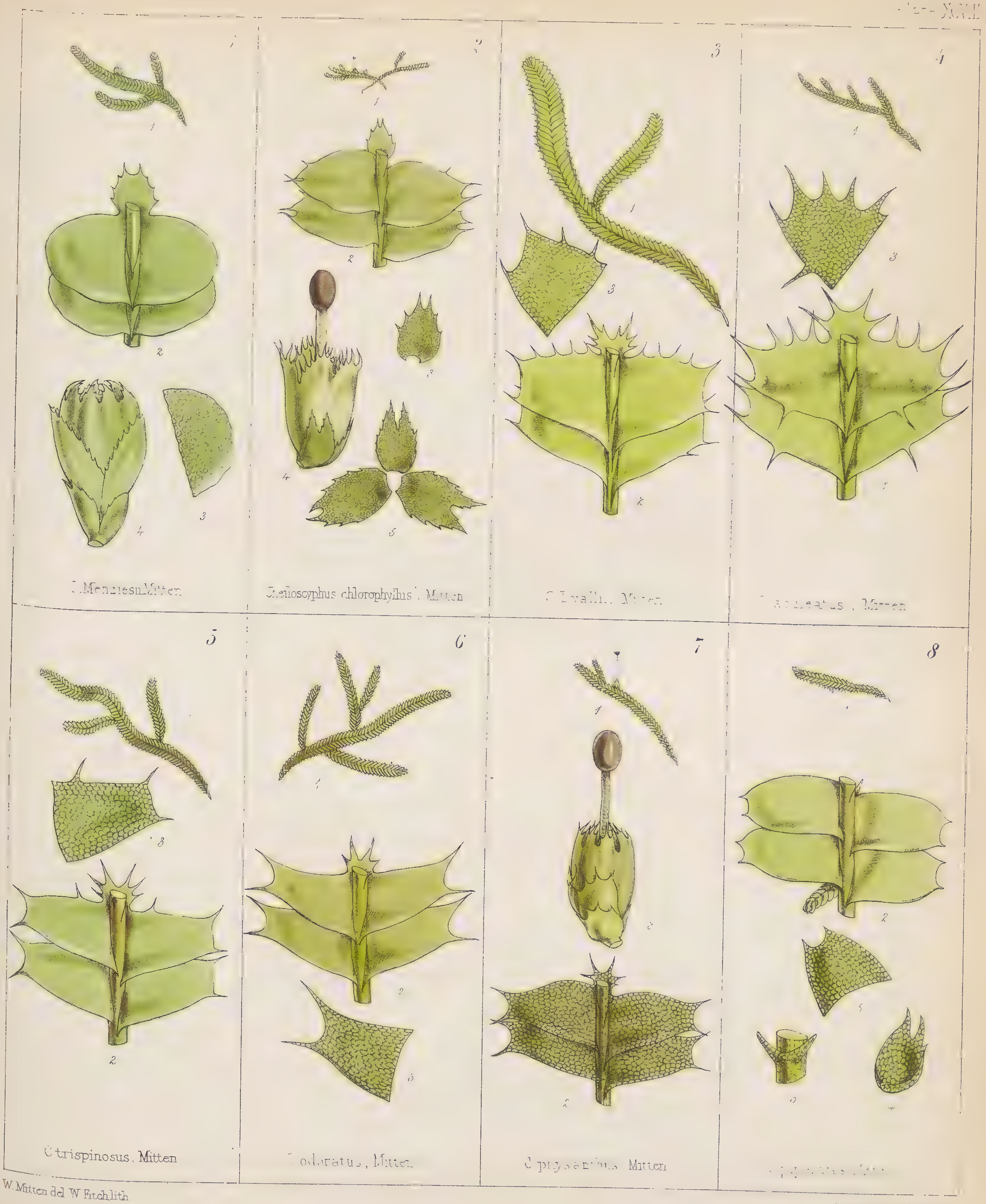
Vincent Brooks Imp



1. Leioscyphus repens, Mitten
2. Lophocolea lenta Hf & T
3. L. [illegible], Mitten
4. L. biciliata, Mitten
5. L. allodonta, Hf & T
6. L. Colensoi, Mitten.
7. L. triacantha, Hf & T

W. Mitten del. W. Fitch lith.

Vincent Brooks Imp.



W. Mitten del. W. Fitch lith.

Plate XCIX.

W. Mitten del. W. Fitch lith.

Vincent Brooks Imp.

W. Mitten del. W. Fitch lith.

Vincent Brooks Imp

Gottschea tulrides Hf &T

G Balfouriana Hf &T

G. repleta Hf. &T.

G. ciliata, Mitten

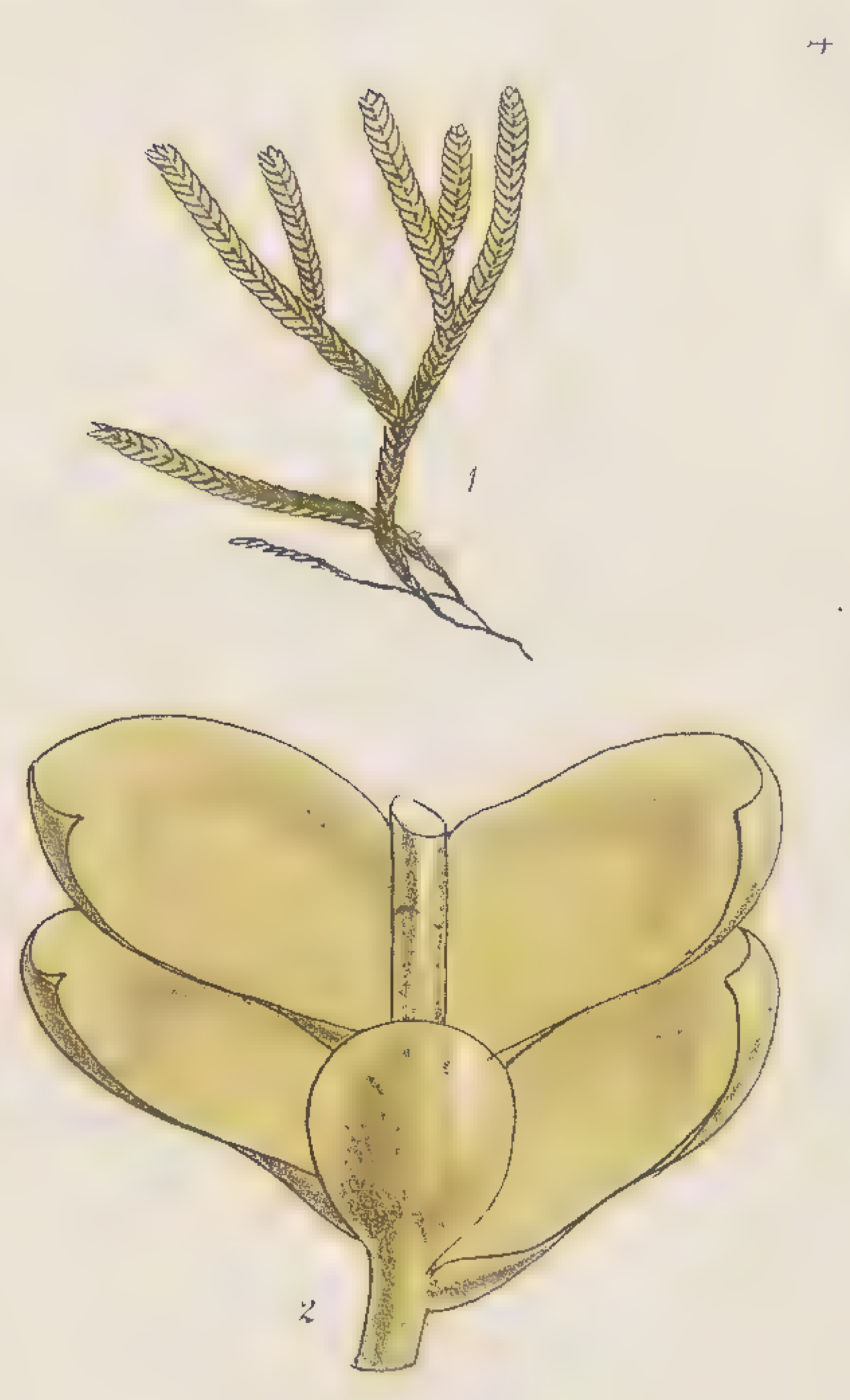
W. Mitten del. W. Fitch lith.

Vincent Brooks Imp.

Gottschea unguicularis Hf & T

Sendtnera attenuata Mitten.

Lejeunia Stephensoniana Mitten



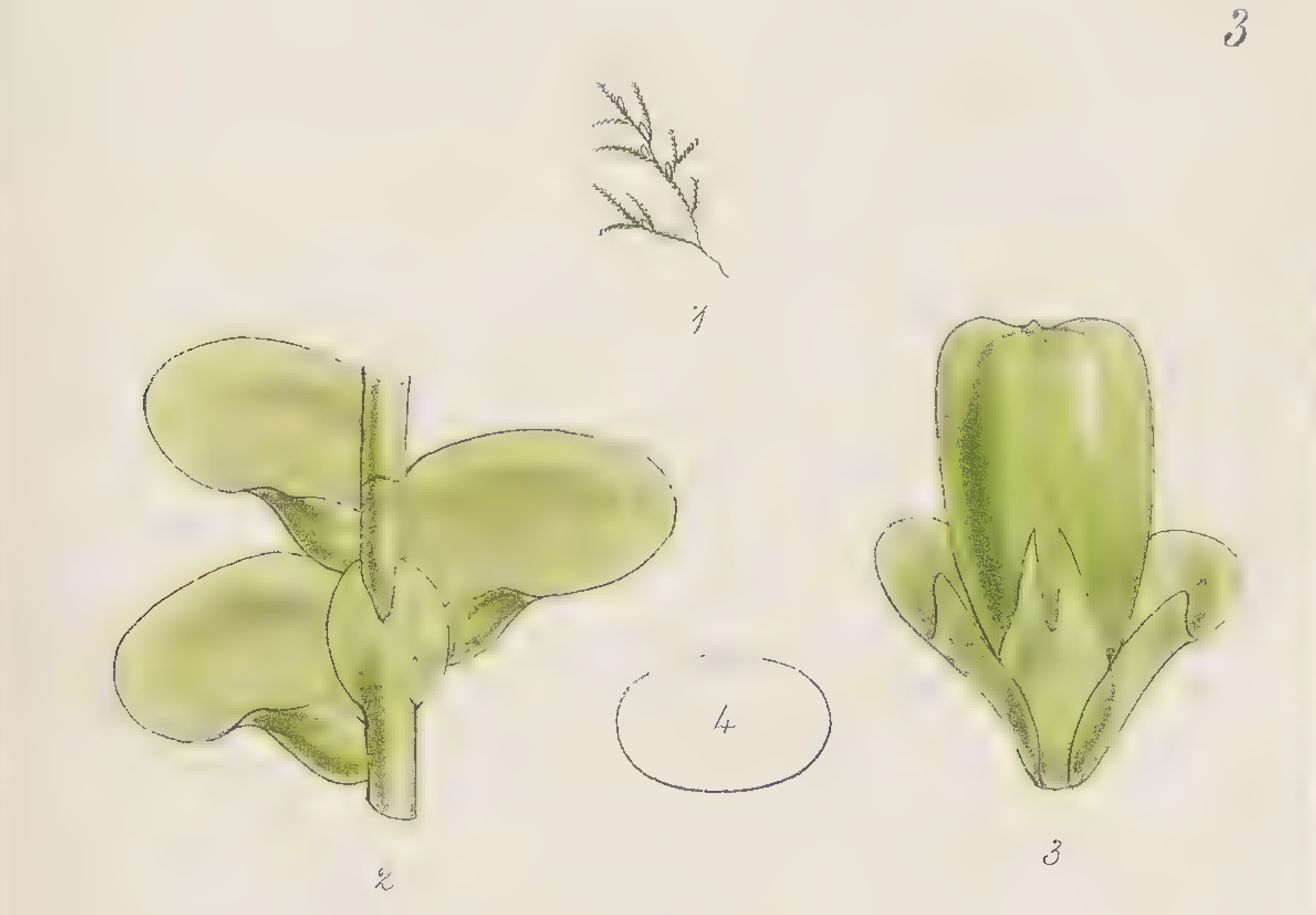
L. scutellata Mitten.

L. anguiformis, Hf & T.

W Mitten, del. W. Fitch lith.

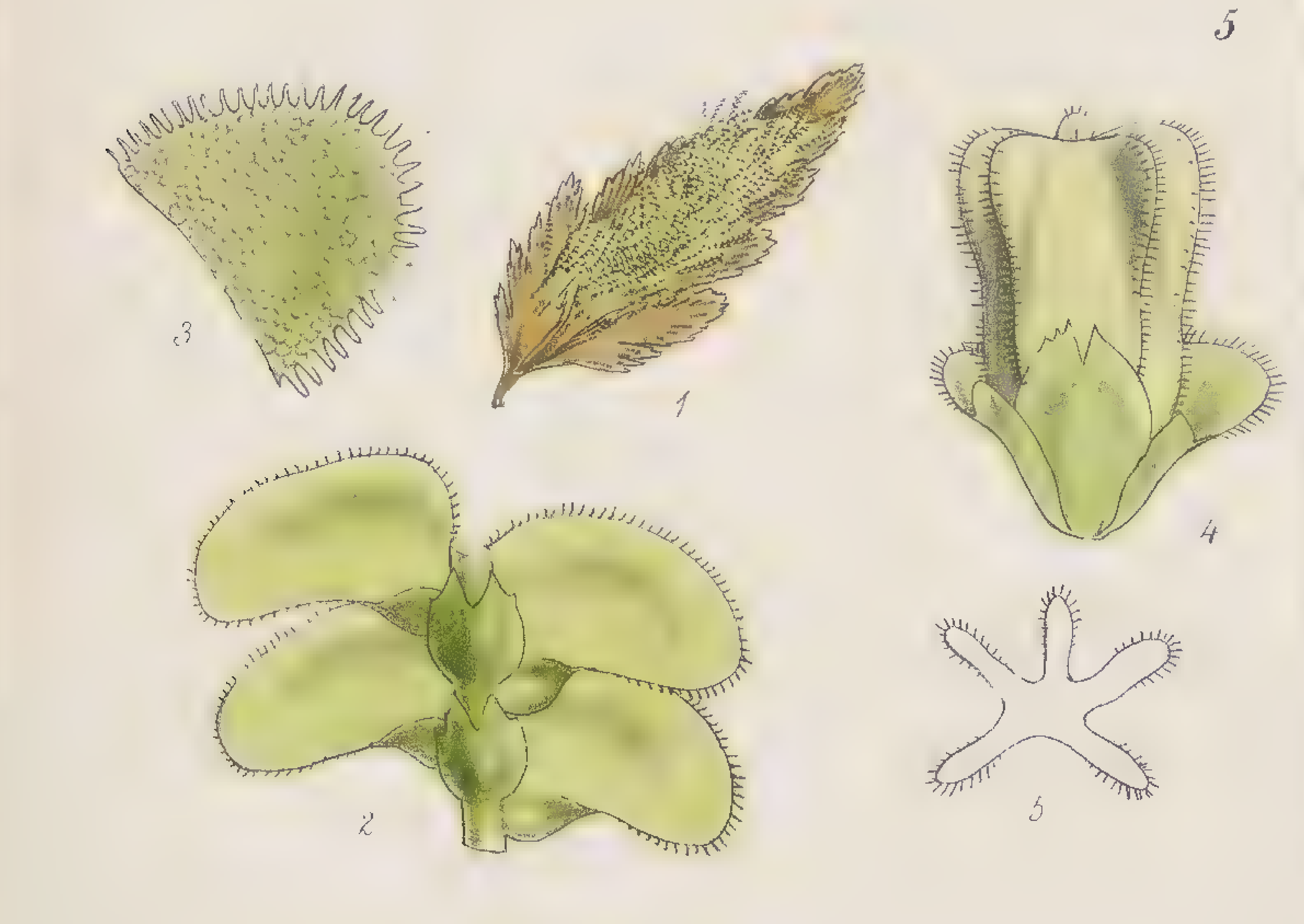
Lejeunia olivacea, Hf & T

L. pulchella, Mitten



L. tumida, Mitten

L. nudipes, Hf & T.



L. papillata Mitten

Frullania squarr[illegible] [illegible]

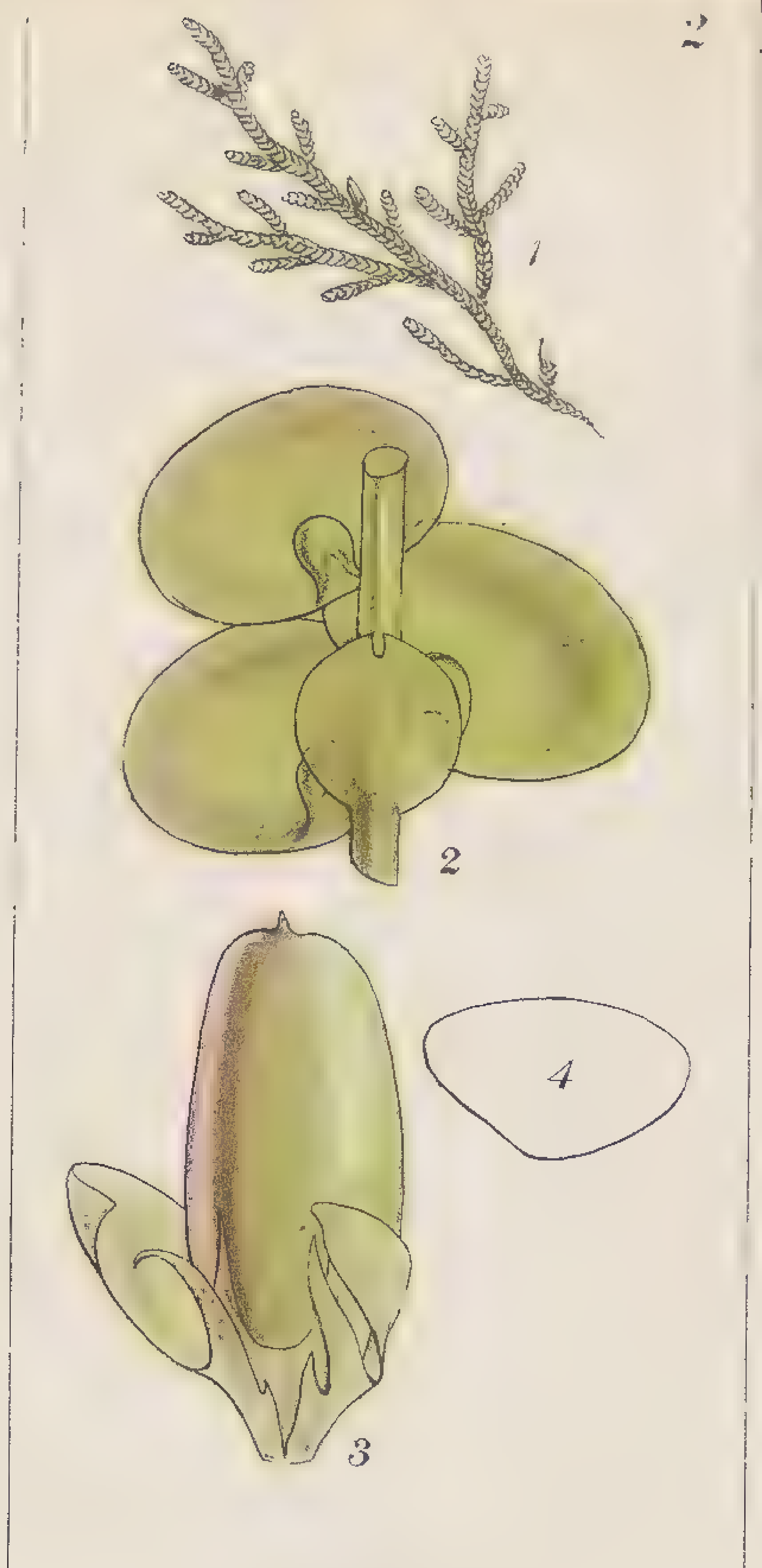
W M[illegible] W.Fitch lith.

Vincent Brooks Imp

1

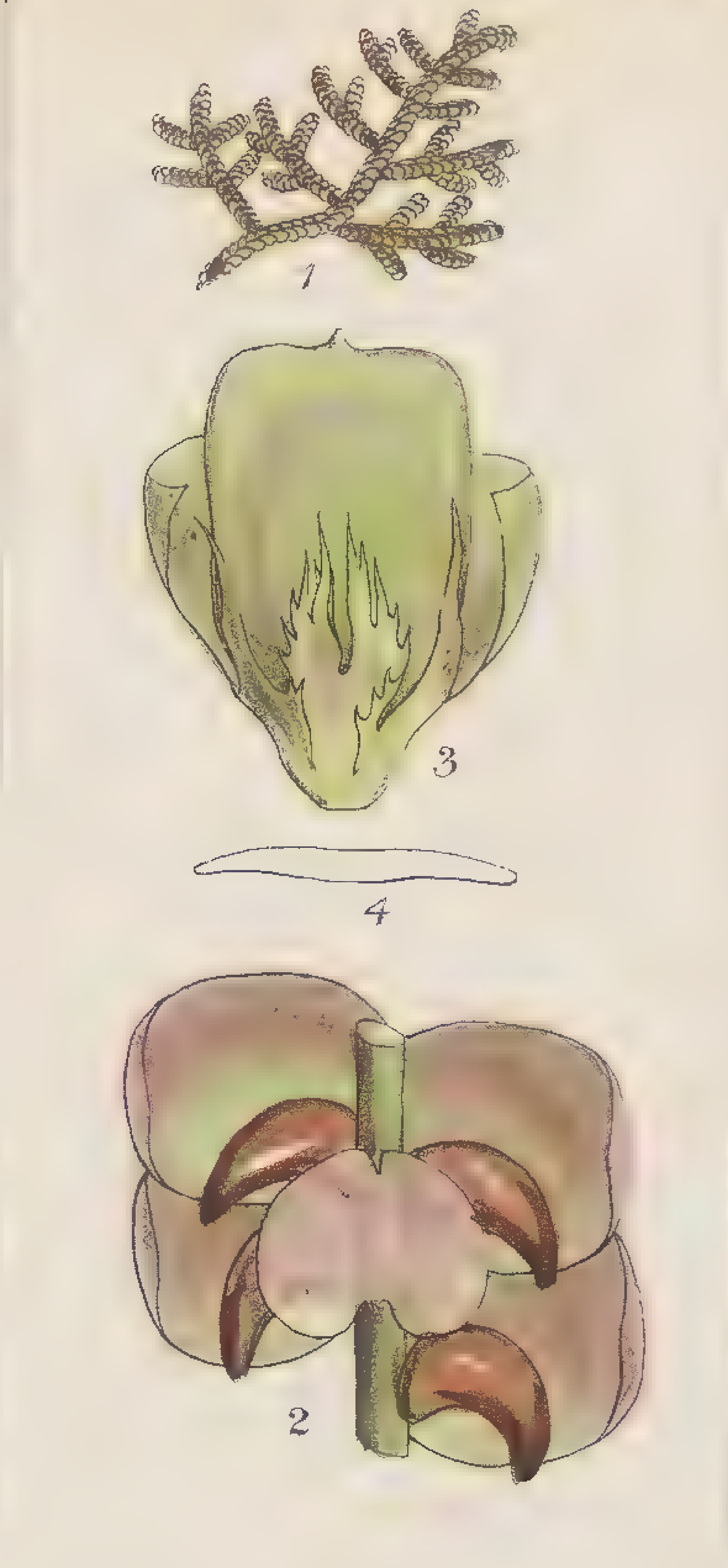
F. rullania patula, Mitten.

2



F. spinifera Hf. & T.

3



F. deplanata Mitten

4

F. reptans. Mitten

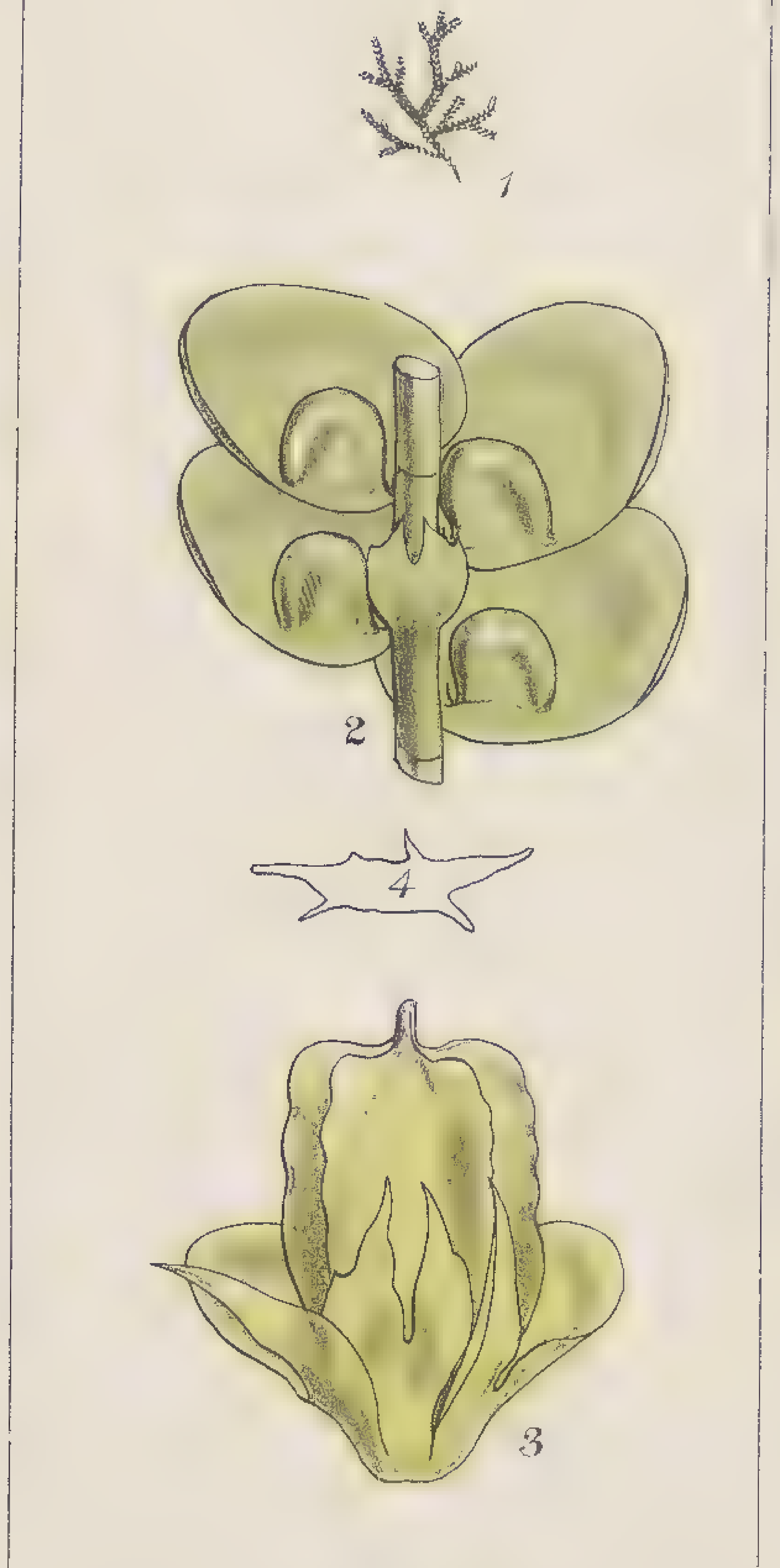
5

F. fugax, Hf. & T

6

F. incumbens Mitten.

7



F. pentapleura, Hf. & T.

8

F. cornigera, Mitten.

W Mitten del. W. Fitch lith.

Vincent Brooks Imp

Plate CV.

M. J. B. delt. Fitch lith.

F. Reeve imp.

1.
2.
3.
5.
6.
7
8
9.
10
11.
12
13.
S hæria Acetabulum B.
S Coffeata, B.
S fragilis, B.
Hendersonia hyalospora, B
Phoma amella, B.
Nectria polythalama, B
Ustilago bullata, B
Ustilago trichophora, B

Landsburgia quercifolia, *Harv*

W.H.H. del.et.lith.

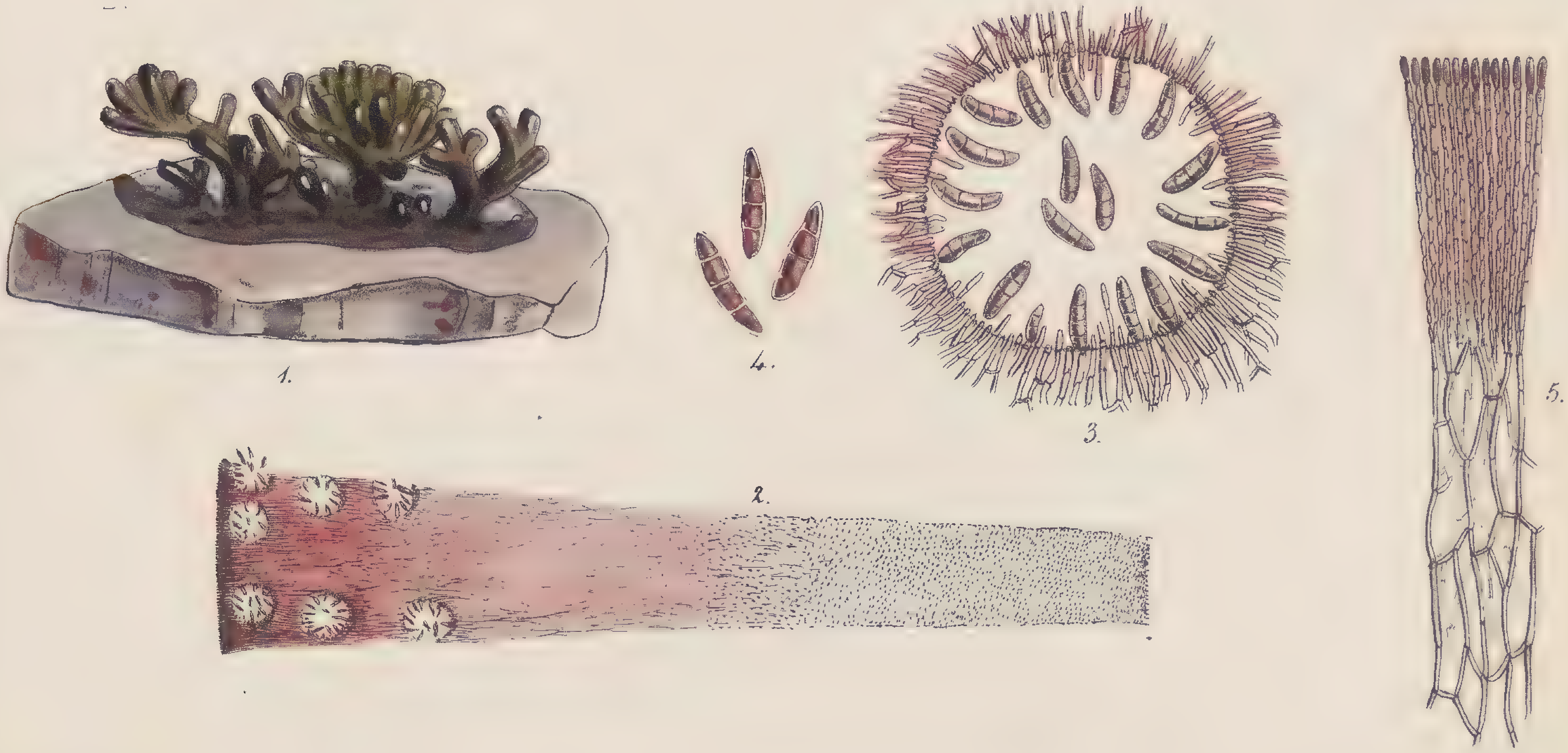
Cystophora Lyallii, *Hook. fil. & Harv.*

Cladhymenia oblongifolia,

del. et lith.

Delesseria Hookeri, Lam.

Apophlœa Lyallii, *Hook. fil. & Harv.*



Apophlœa Sinclairii, *Hook. fil. & Harv.*

Plate CXVII

F. Reeve, imp

Rhodophyllis membranacea, Harv.

W.H.H del et lith.

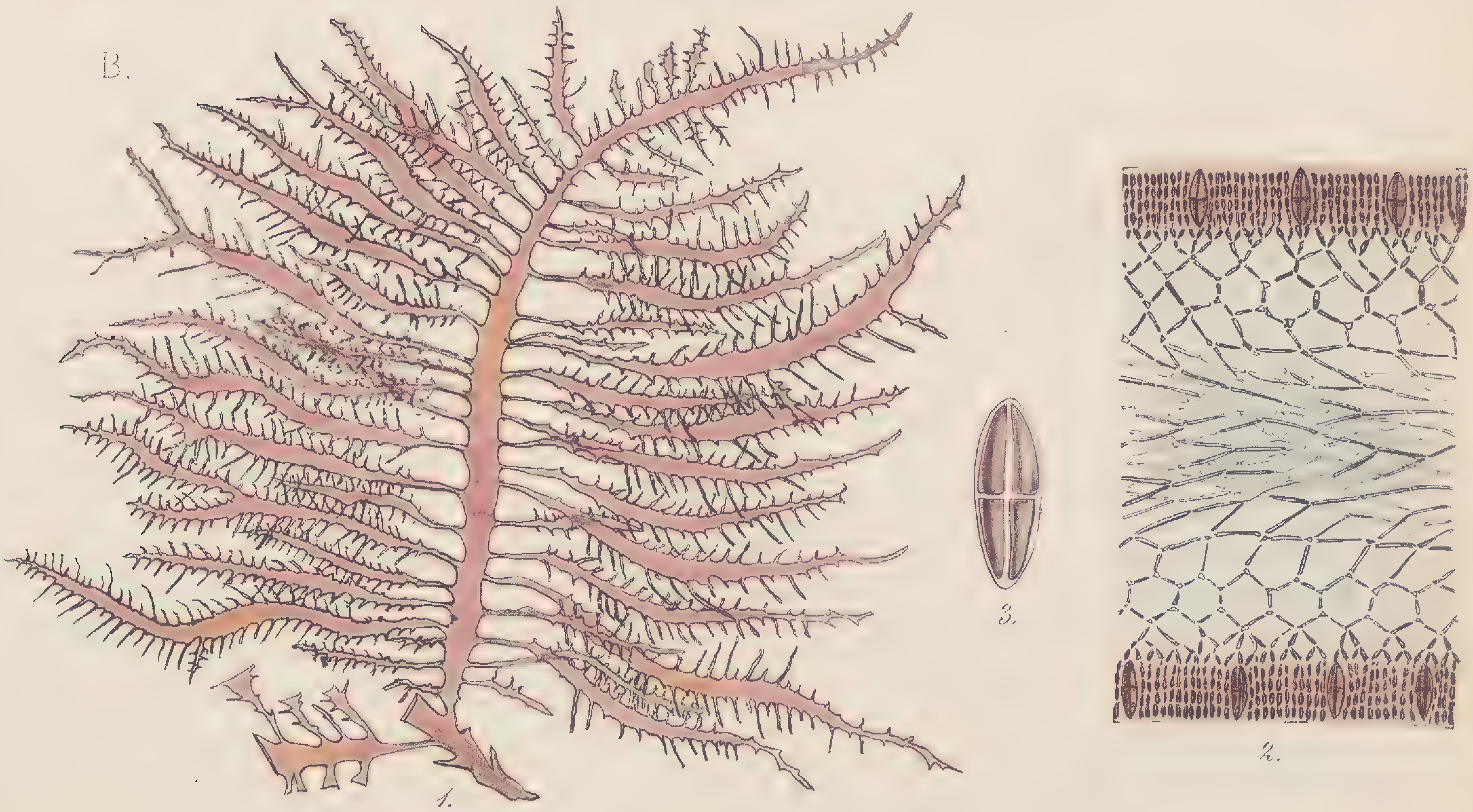
Callophyllis erosa, *Hook, fil. & Harv.*

Plate. CXX.

A.

Prionitis Colensoi, *Hook. fil. & Harv.*

B.



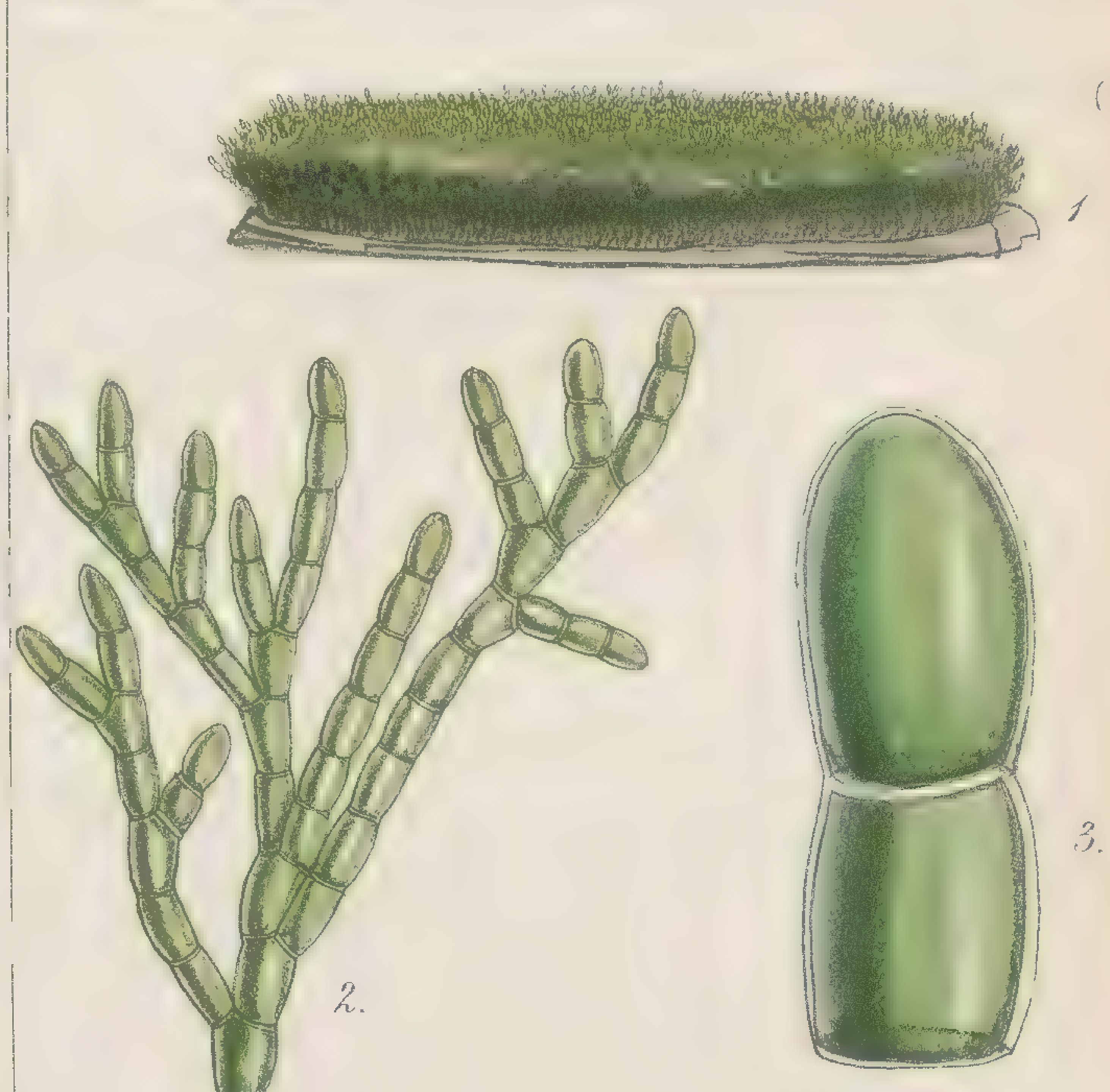
W.H.H. del. et. lith.

Nemastoma pinnata, *Hook. fil. & Harv.*

W. H. H. del. et lith

Caulerpa Brownii, *Endl.*

Caulerpa furcifolia, *Hook. fil. & Harv.*



F. Reeve, imp.

Cladophora Lyallii, *Hook. fil. & Harv.*

Sticta Colensoi, *Bab.*

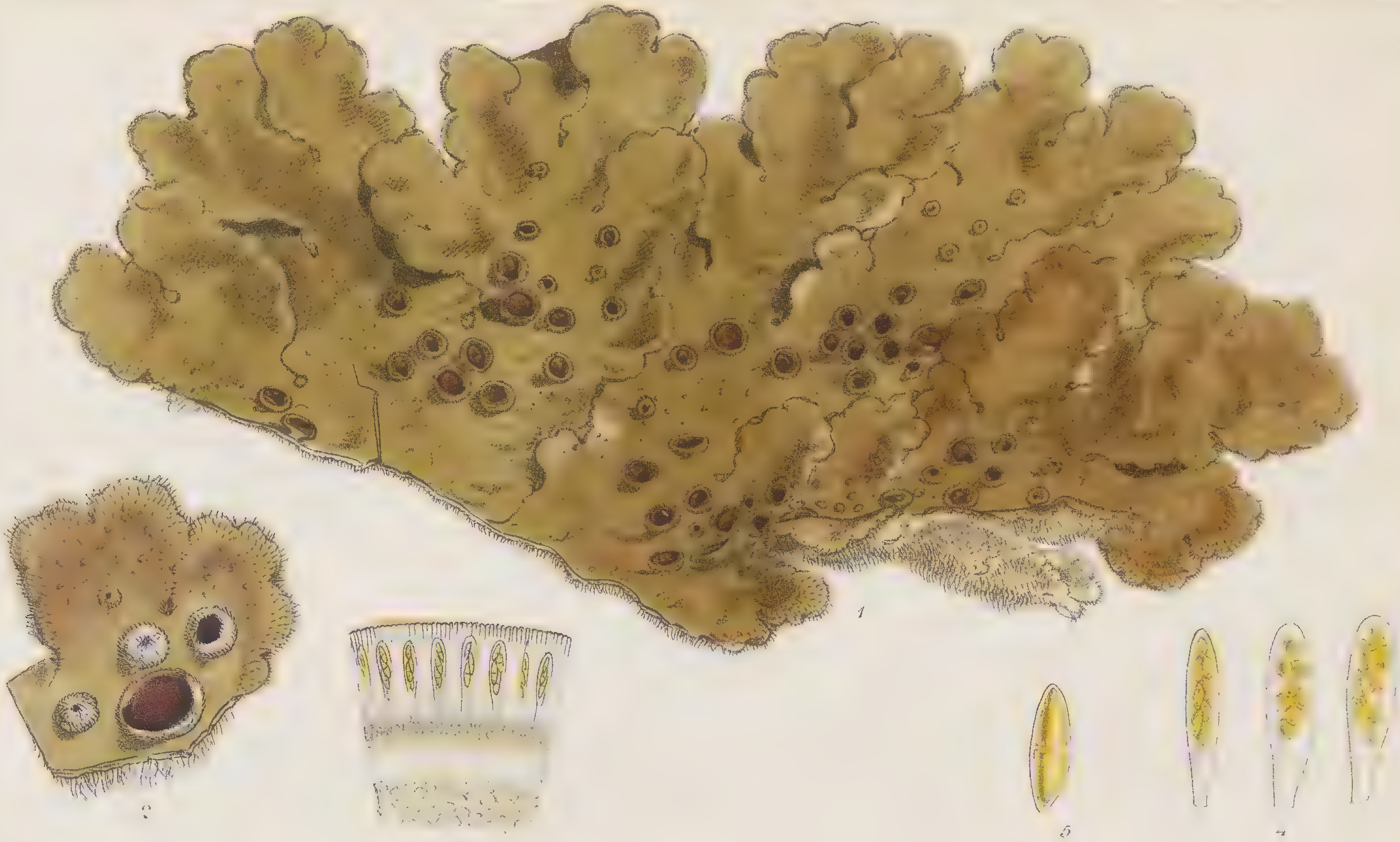
W Fitch del. et lith. J. D. H. anal. | Vincent Brooks Imp.

Sticta foveolata *var.* cellulifera, *Bab.*

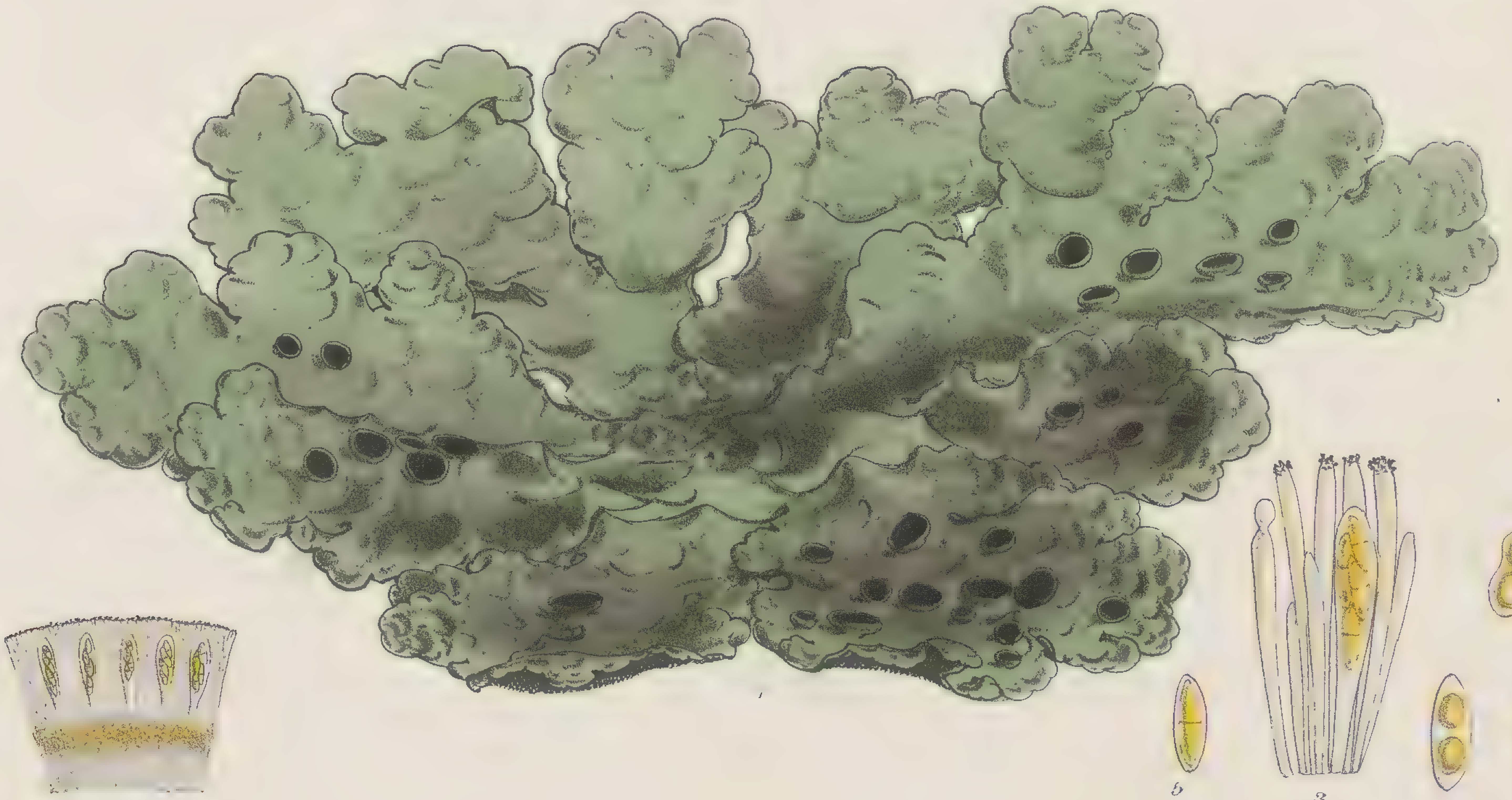
W. Fitch del et lith. J.D.H. anal

Vincent Brooks imp

A



Sticta coriacea *Hf & Tayl.*



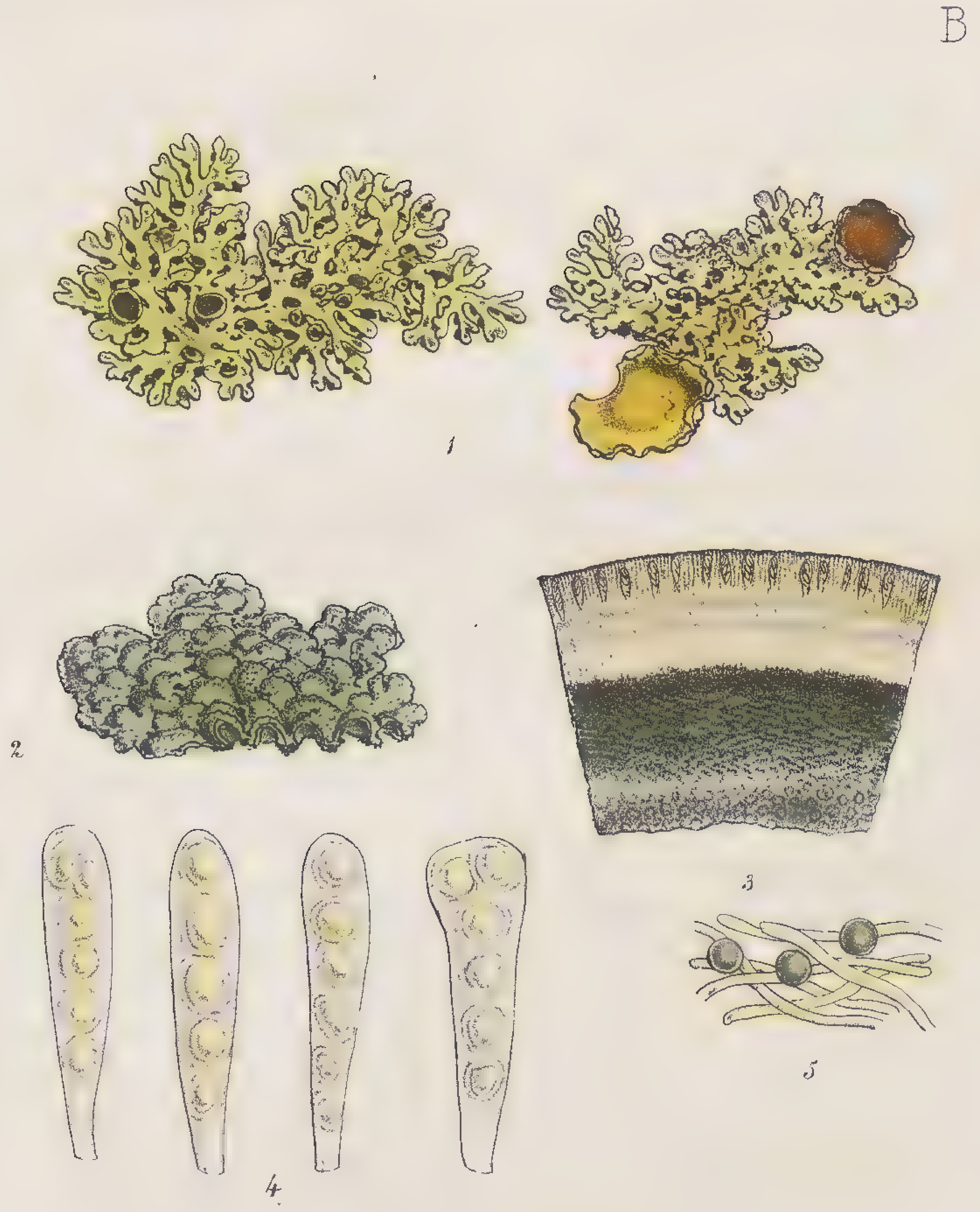
Sticta Hookeri *Bab.*

W. [illegible] del. et lith. J.D. [illegible]   Vincent Brooks imp.

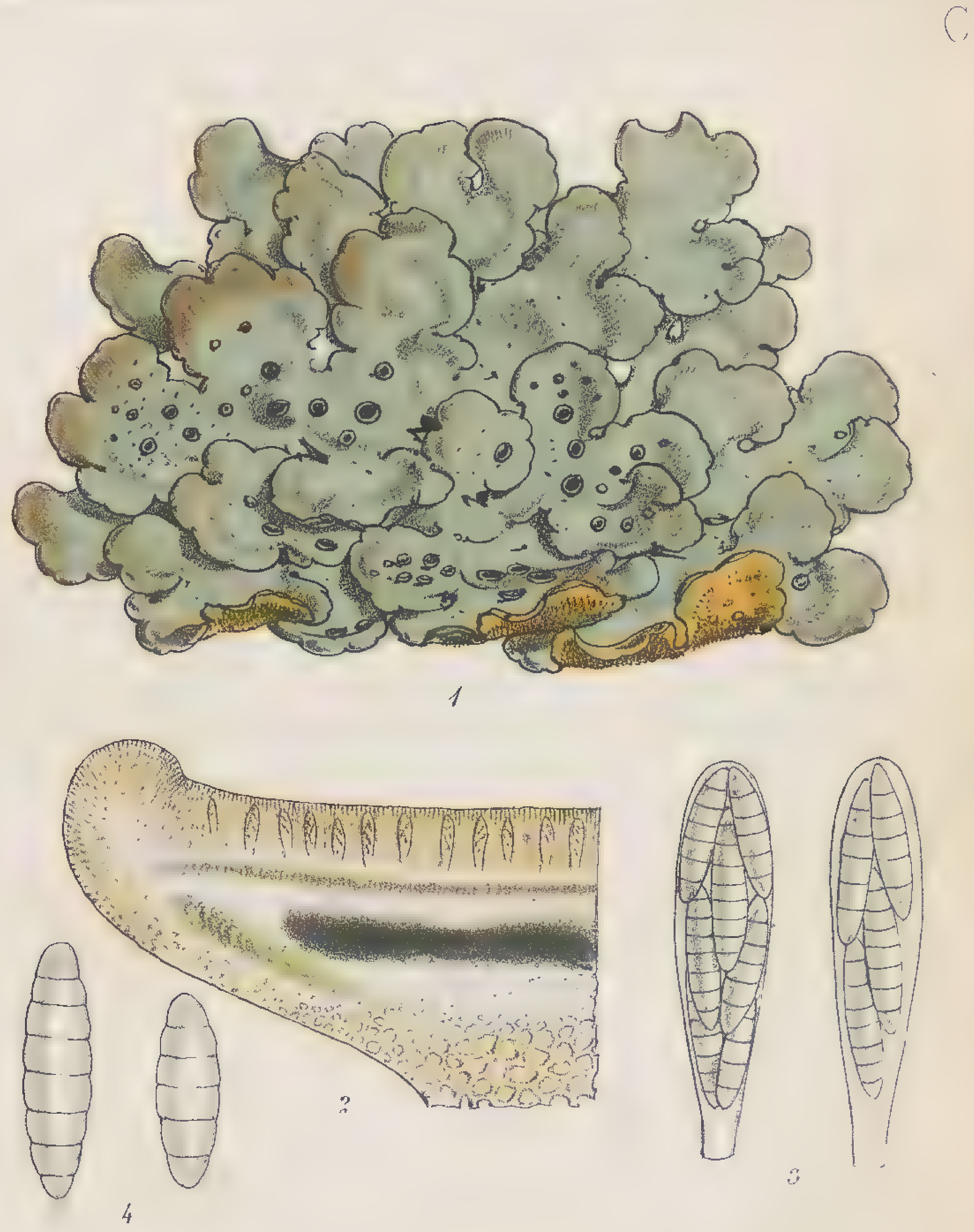
Sticta carpoloma, *Delise.*

Vincent Brooks imp.

Nephroma Lyallii, *Bab.*



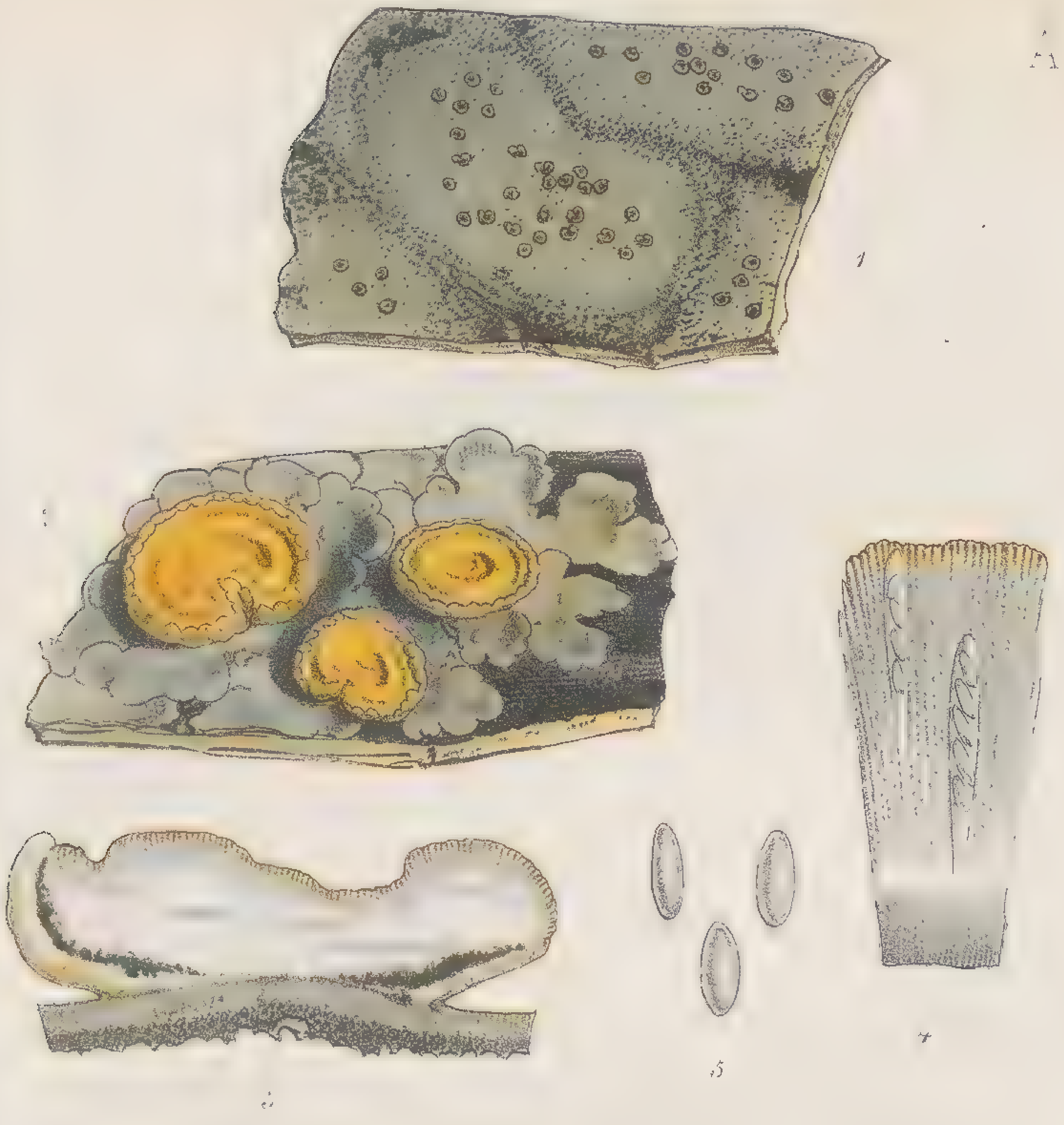
Parmelia moniliformis, *Bab*



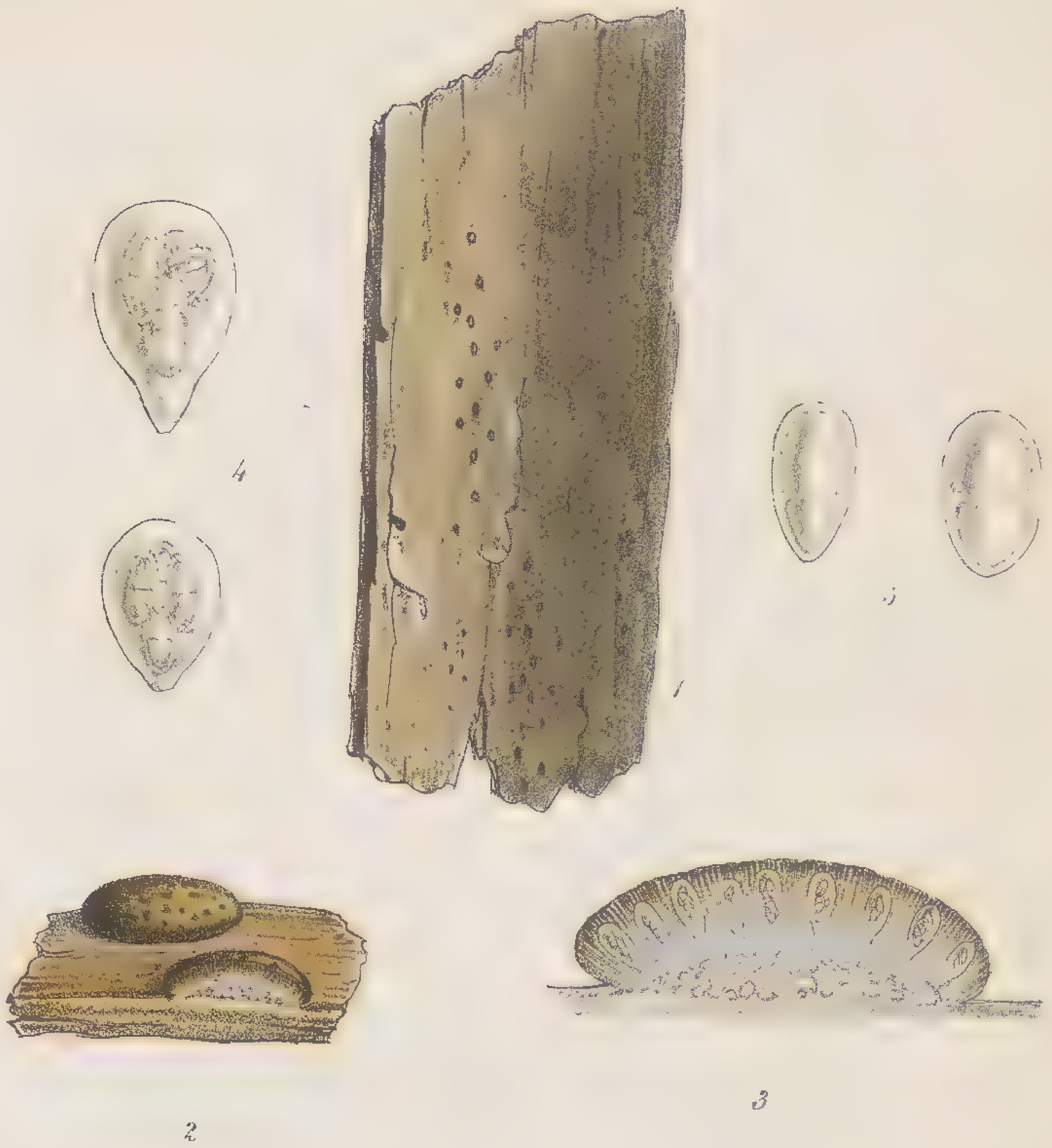
Sticta cinereo-glauca *H f & Tayl.*

W Fitch del et lith J D H anal

Vincent Brooks Imp.

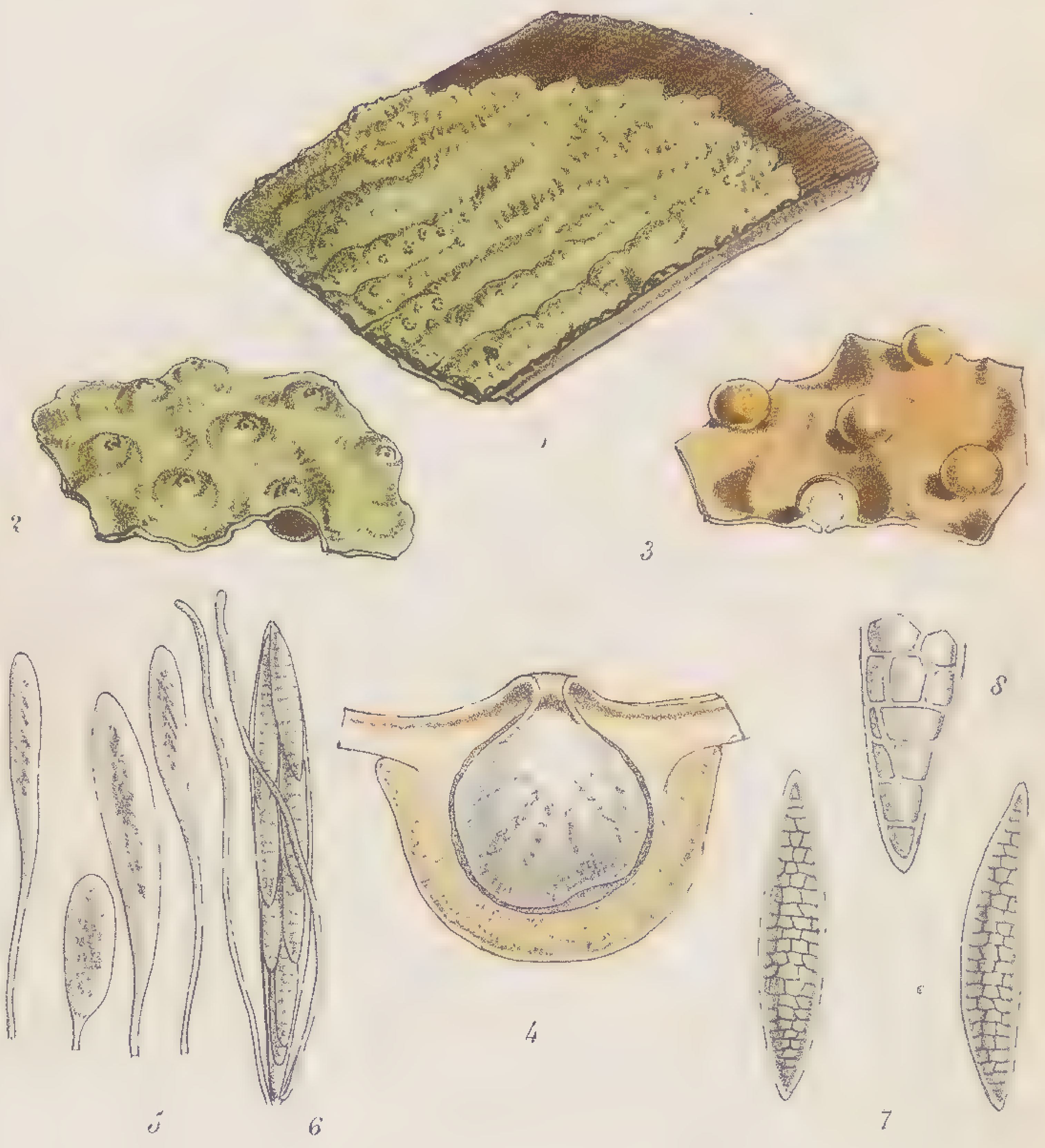


[illegible]



Myriangium inconspicuum, *Bab*

[illegible] pygmaea, var intermedia, *Bab.*



Porina endochry[illegible] *Mont.*

A

Parmelia pyropthalma *Mont.*

B

Biatora marginiflexa *Bab.*

C

Biatora cinnabarina, *Fries*

D

Coccocarpa smaragdina, *Pers*

Vincent Brooks imp

Stereocaulon Colensoi, *Bab.*

Cladonia capitellata *Bab.*

Sphærophoron australe *Laurer*

Vincent Brooks imp.

MAR 14 80
AUG 6 '80